

THE JOURNAL

OF THE

ROYAL UNITED SERVICE INSTITUTION.

VOL. XLIV.

JANUARY, 1900.

No. 263.

[Authors alone are responsible for the contents of their respective Papers.]

THE RECRUIT FROM A DEPÔT MEDICAL OFFICER'S POINT OF VIEW.

*By Lieut.-Colonel C. M. DOUGLAS, V.C., M.D. (Hon. Brigade-Surgeon),
Army Medical Service.*

Wednesday, October 25th, 1899.

Major-General J. F. MAURICE, C.B., R.A., *p.s.c.*, Commanding
Woolwich District, in the Chair.

THE raw recruit is the foundation-stone of the prosperity of the British Army. Perhaps the raw recruit fails to appreciate this fact and to understand his important position. Nevertheless, it is a mere truism to assert, that without him the Army would be impossible, that, if he is a worthless incapable, the whole structure will fall to pieces. The magnetic influence of a brave, enthusiastic, and self-sacrificing leader will be exerted in vain on a band of effete, spiritless conscripts. Let us examine as far as we can, without prejudice, the condition of this foundation-stone. The medical officer literally sees more of the recruit than anyone else. He is biased by no motive in accepting or rejecting recruits, and, consistent with the regulations, he conscientiously endeavours to do his best for the Service—in helping to supply “likely young men to serve Her Majesty.”

What (speaking in quite unofficial language), asks the philosopher, is the net purport and object of war? And he describes the recruits from the British village of Drumdrudge, “the weakest of whom can stand under thirty stone avoirdupois.” (These are ideal recruits. I should be sorry to put thirty stone on the back of an average “special.”) These thirty recruits are pitted against thirty from a French village of Drumdrudge, and, at the word “Fire,” they blow the souls out of one another.

So war is “destruction.” But, we hope, it is destruction of the effete, the vicious, and the degenerate. It is chiefly upon these, directly and indirectly, that the storm bursts. True, many of the brisk, useful craftsmen are also destroyed. The tares and the wheat fall together. Much of what is good and noble is swept away. But the tiger and the ape are

gradually worked out, and a higher type of humanity comes in slowly in their place. It is a rude but necessary discipline; a harsh, indiscriminating, and uncertain scourge, to be dreaded and avoided if possible—to be done with and forgotten as soon as they can both by victors and vanquished.

A higher religion or a better conception of the precepts of the Founder of our Faith will ultimately render it unnecessary, or rarely resorted to. In place of international warfare, we shall have increasing intestinal strife against the principles of evil, which cause decay, degeneration, and premature death of individuals, communities, and nations; against evil in its repulsive forms of greed, cruelty, lust, oppression, and self-indulgence.

Slowly advancing and receding, like the waves of an incoming tide, we are gradually moving higher. But wars, diminishing in frequency and severity, will continue for some æons, in spite of the efforts of the best and noblest amongst us.

To make the destructive spirit as effective as possible, to inspire masses of men with a right spirit of self-sacrifice, of confidence in their leaders and themselves, is the aim of all military organisation. We call this martial spirit various names, *moral*, *esprit de corps*, borrowing these words from our martial neighbours. Each nation glorifies its fighting-men as superior to all others, although most admit that the article "Made in Germany" has considerable merit.

The foreign officer somewhat sarcastically observes, I believe, that "we, the British Nation, have no Army."

He implies, I presume, that we have no military organisation such as the Armies of the Continent, which represent the whole fighting spirit of the nation combined. We have a heterogeneous mixture. A comparatively small collection of highly trained soldiers, which forms a nucleus round which are aggregated bands of armed citizens, inspired with more or less of the martial spirit alluded to, and engrained with varying quantities of military discipline. In the Home District these forces are combined at manœuvres in masses apparently homogeneous to the unmilitary eye, but at the remoter military stations each moves in its special sphere, with little combinations for exercises, except perhaps on a small scale.

The nucleus we call the "Army." The revolving satellites are the "Auxiliary Forces," as alluded to at public meetings and social gatherings.

It is the recruit for the Army proper that I will attempt to draw, as I see him: a compact, vigorous, well-developed, and proportioned person, usually denotes a high degree of animal vitality, and of the quality which is known as "hardihood"—most desirable in a soldier. Occasionally great vital force and energy have inspired puny or weakly organisations, such, for example, as William of Orange, Wolfe, Nelson; but these are exceptional instances. The arrested bodily development seems to have given free scope for the growth of spiritual energy of the highest type. Such cases are rare; they may be looked on as "sports," in fact.

Hardihood then is the first essential of a soldier. Let us examine the raw material at a recruiting centre to see how far we obtain the vigorous, healthy husk which encloses the grain of vitality; that unknown, mysterious quantity which is variously denominated "vital power," "soul," "courage," "spirit."

The dépôt is a remote one, but is above the average of provincial dépôts in providing recruits for Her Majesty's regiments.

I have also taken averages from another dépôt, to which recruits are sent from other districts, as this dépôt does not provide a sufficient number of recruits to supply the demands of the regiment of which it is the recruiting centre.

The recruits represent, I believe, the average physical development of the young men who enlist in the Northern District of England, and of Scotland.

About ten in the morning, into a barrack room, furnished with appliances for testing height, weight, and eyesight, a small band of the would-be soldiers of the Queen enter. Two or three may be average, well-developed young men, six or eight sallow nondescript youths, the artisan element being most in evidence. They have a quiet and rather downcast expression as a rule. The most cheerful are those who have served a training or two in the Militia. First their eyesight is tested by their ability to count dots at a required distance. Perhaps one who repents having taken the Queen's shilling wilfully makes a mistake, generally easily detected (though occasionally due to a genuine defect), another will fail through nervousness, and some of the others with apparent perverseness may follow suit, greatly to the disturbance of the recruiting sergeant's peace of mind.

Generally this examination is satisfactorily concluded; each recruit is now carefully scrutinised, much after the fashion of a hunter by a vet. The weight and height of the candidate are first taken, the circumference of his chest at rest, as far as he can be induced to allow his lungs to act naturally. His head and teeth are examined, and the latter are generally found more or less unsound—a perfectly good set of teeth is rare in my experience, except among the agricultural recruits. His lungs and heart are sounded; he is put through his paces—walking, hopping, and various exercises—to show that he has perfect use of all his limbs. His mental qualifications are tested by a few simple questions. A high standard of intelligence is not looked for, though I have known a recruit rejected for "mental deficiency" after he joined his regiment, because when he was asked who was his father, he appeared confused. "It's a wise child that knows his own father."

The standard of intellect in this regiment was high, and though the mode of ascertaining whether the recruit came up to it was somewhat primitive, it was to the point.

The minimum physical standard is low:—

Weight, 115 lbs.

Height, 5 feet 3½ inches.

Minimum girth of chest, 33 inches.

Age, 18 years.

This does not represent a fine type of a British male. Many are enlisted who do not come up to this standard. These are known as "specials," but not in the usual acceptance of the term "special." They are recruits who do not quite come up to the standard of height, weight, or chest measurement, but who are likely to develop into efficient soldiers. Some of these "specials," who lack perhaps half an inch of the standard of height, are better men than those who surpass it. A short, muscular, well-formed man, of the type of "Ortheris," makes a most efficient soldier. He is generally more active than a big man, has less to carry in marching, and, as an eminent scientist has pointed out, there are many chances in his favour against his being hit by a bullet, which would disable a bigger soldier. I was rather surprised to find that the average height of a number of recruits rejected by myself for various causes was greater than that of those whom I passed.

An American gentleman, Professor Dudley Sargent, of Harvard University, took the measurements of the body and limbs of several thousands of American students ranging from sixteen to twenty-six years of age, an equal, or nearly equal, number of each age, and from these measurements had a statue made. It seems to me an important contribution to anthropometry.

The American students are drawn from all classes of the community, proletarian and patrician (for there is a patrician class in that country, where all men and women are born free and equal), and the statue represents the average physical development of the best of the American youths—a physical standard of youthful manhood which it would be desirable to obtain. If we enlisted an equal, or nearly equal, number of recruits of each age, from eighteen to twenty-six years, we might expect to obtain as good a result or better. Our minimum age is higher, and we reject the recruits who do not come up to a certain standard. Nevertheless, the physical average of our recruits is much lower, chiefly owing to the immature age at which we have to enlist. Here is the average physical development of the British recruit for the purpose of comparison, and these are the measurements:—

American Student.

Age, 22 years 3 months.
Weight, 156 lbs.
Height, 5 feet 8 $\frac{1}{4}$ inches.
Girth of chest, 34 $\frac{1}{2}$ inches minimum, 36 $\frac{1}{2}$ maximum.
R. upper-arm, 11 $\frac{1}{2}$ inches.
R. fore-arm, 10 $\frac{1}{4}$ inches.

British Recruit.

Age, 19 years 4 months.
Weight, 126 lbs.
Height, 5 feet 5 $\frac{3}{8}$ inches.
Girth of chest, 33 $\frac{1}{2}$ inches minimum, 35 maximum.
R. upper-arm, 10 $\frac{1}{2}$ inches.
R. fore-arm, 9 $\frac{1}{2}$ inches.

The measurements are taken from a few pages of the recruit registers of two dépôts selected haphazard. After I had made up my averages, I had the satisfaction of finding they corresponded within a few fractions of the averages of the recruits for the whole Army as given in the Annual Report for 1897. My averages are a few fractions higher. I think they may be accepted as approximately correct, though I admit my researches in anthropometry are poor and meagre as compared with Dr. Sarjent's.

A writer of a recent book on the "Queen's Service," from the point of view of the private soldier, speaks of the "vagaries" of Army medical officers for accepting or rejecting recruits. The usual average of rejections is a little over one-third; some reject more, others less. A medical officer who is very "particular" might, I believe, find a sufficient cause for rejecting two-thirds of the raw recruits who come up for examination. Indeed, a case of wholesale rejection came under my notice many years ago. Rather a large batch of some twenty-five or thirty recruits, who had been passed by a civilian practitioner in a town in the Midlands, were rejected by an Army medical officer when they came up for final approval. A short time afterwards I met the officer who had made this wholesale rejection of one hundred per cent. Said I, "Wasn't there one good one in the lot?"—*nec quisquam ex agmine tanto?* "No," said he, "every one had something wrong with him."

Insufficient development, a failure to come up to the standards of height, weight, or chest measurements required, give the greatest number of rejections. No doubt many of those whose chest measurement is small and expansion defective have the seeds of latent lung or heart affection. Varicose veins and defects of the lower extremities also cause many rejections. Loss and decay of many teeth cause an unexpected number of rejections. Some of them who have lost their teeth by accident or the use of improper food when getting their second set of teeth, are well-developed strong young men otherwise, who would make good soldiers in spite of this defect, which may not tell upon them until late in life. They can generally "chaw," as they express it. Indeed, in many of these cases loss of teeth does not seem to be so much a defect as hardened gums an acquisition. But when the deficiency of teeth is associated with a weakly, degenerate frame it is quite another matter.

Looking at him in the totality, the average recruit is not a fine specimen of the animal *bimana* with a thumb to his wrist. The minimum standard is intended to keep out undesirable recruits; and those who just succeed in passing it, and there are many of them, are on the verge of the undesirable. It has been said that our standard is higher than that of the recruit of the Armies of Continental nations. The comparison is not quite just. Those nations who have compulsory service may be said to use a net, the meshes of which will *not* allow the little fishes who may be of use to escape; while the meshes of our net are made as large as we dare, to capture only the best fish and let the little ones get away.

Enlistment in the British Army is called "voluntary," but the term is scarcely applicable to a great many of them. The enlistments are "compulsory." The compulsion is exercised by two powerful, invisible

recruiting sergeants, "Want" and "Hunger." A writer in a recent number of the *Fortnightly Magazine* on "Our Boys," says:—"The Army is the last refuge of an honest lad who has failed in life." If so, it must be an unpleasant reflection to the medical officer who rejects some thirty or more per cent. of would-be recruits, that he condemns those rejected ones to dishonest courses. Certainly I have often pondered over the prospects in life of the recruits who have failed to come up to the rather low standard which is required; "it gives something to think seriously about." What can these rejected ones do to earn a livelihood? Join the ranks of the Hooligans, incapables, and criminals, and enlist in the great army of the "noxious poor," of the Submerged Tenth, which obtrudes itself on one's notice and will not be ignored. Kaye, the historian of the Indian Mutiny of 1857-58, contrasts in striking colours the conditions under which the British youth became a soldier, with those which caused the natives of Hindostan to join the ranks of the army of Jan Cumpani. I hope I may be excused for quoting it. "In England few men enlist into the Army as an honourable profession, or seek it as an advantageous source of subsistence. Few men enter it with any high hopes or pleasurable emotions. The recruit has commonly broken down as a civilian. Of ruined fortune and bankrupt reputation, he is tempted, cheated, snared into the Army. Lying placards on the walls, lying words in the pothouse, the gaudy ribbons of Sergeant Kite, the drum and the fife and the strong drink captivate and enthrall him when he is not master of himself. He has quarrelled with his sweetheart or robbed his employer; he has exhausted the patience of his own people, and the outer world has turned its back upon him, and so he goes for a soldier. As soon as he has taken the shilling he has gone out of the family circle and out of the circle of civil life—he is a thousandth part of a regiment of the Army. Perhaps he has changed his name and stripped himself of his personal identity; anyhow, he is as one dead. Little more is heard of him, and unless it be some doting old mother who best loves the blackest sheep of the flock, nobody wishes to hear. It is often indeed no greater source of pride to an English family to know that one of its members is serving the Queen in the ranks of the Army than to know that one is provided for as a convict at the national expense."

So wrote Kaye in 1864, the days of that long service, which some of our military critics think it would be desirable to re-introduce. The recruit of the present day, as far as I know him, does not enlist because he has quarrelled with his sweetheart; he loves the sex in the aggregate, not in the particular. If he has robbed his employer, it is not because the latter has advanced him to the responsible position of the care of the till. "What makes you enlist?" is the question I almost invariably put to the recruit who comes up for examination. At a rough estimate fifty per cent. reply "Out of work," "I had nothing to do." When this powerful motive is not the cause, the answers I receive to my questions are often very vague and uncertain. "I took a liking," "I was tired of my trade," "I had a quarrel with my father—with my brother—with my partner," "I was drunk and didn't know what I was doing," "I don't

know," "To be with my chum." Those who enlist because they have a liking for the military profession are of course the most desirable recruits. It would be impossible to arrive at any accurate opinion as to the number which enlist from this motive, as often it is not the only one.

The occupation, or want of it, which the recruit has followed before enlistment, can generally be told with more certainty. The work of the artisan, the agriculturist, the navvy, all impress a young man with their character.

Professor Parkes, writing many years ago, estimated that out of every thousand recruits from all parts of the kingdom, labourers, husbandmen, and servants form one-half; mechanics employed in occupations favourable to physical development, one-sixth; manufacturing artisans, as weavers, cloth-workers, about one-sixth; the rest made up of professional occupations, students, and boys.

The previous occupation of the recruits depends a good deal on the situation of the dépôt. From my experience of those who have come up before me I would estimate their previous occupation as follows:—About one-half wasterels, incapable artisans, vagrants, dead-beats; one-sixth labourers, agricultural and navvies; one-sixth miners, iron-workers, etc.; one-sixth other professions; one-sixth or perhaps more "bounty jumpers"; the rest made up of all sorts of trade. I have found sometimes curious medleys waiting to be examined at the recruiting office who have asserted themselves to be grooms, clerks, waiters, musicians, architects, and some painters, broken-down artists, etc. The cause of some of them enlisting was evident. The *esprit (de corps)* which came from them was quite intoxicating, and I had to stand at a little distance to prevent it getting to my head. The broken-down University man, the gentleman's son, who is supposed by writers of fiction and others to enlist in the ranks and work his way up to a commission, has been a rare bird in my experience. In the south of England, at dépôts which chiefly recruit for select regiments, such enlistments may be more frequent. During some years' experience of recruiting dépôts of the North, I can only remember meeting one recruit who had the characteristics of the well-born and carefully nurtured classes. He had evidently failed in some competitive examination and was trying another avenue to a successful military career. He sat looking dejected and downcast in the office, unwilling to mix with the herd of recruits in the neighbouring room, evidently very sorry for himself. He was a tall nice-looking youngster, and he went successfully through what to him must have been a rather trying ordeal. Probably he had the right stuff in him, and would obtain his commission in due course of time.

Having "passed the doctor" and been accepted by the recruiting officer, the recruit sinks out of private and civil life and becomes a unit of a small military socialism. His individuality is suppressed to a great extent; he lives, moves, and has his being in the company of his fellow units. This environment influences him powerfully for good or ill. When he returns to civil life he is like a fish out of water, lucky if he has not acquired habits which unfit him for employments which might be

suit to the time-expired soldier, who is supposed to be, and who occasionally is, steady, orderly, trustworthy, and obedient, but who often turns out to be a worthless incapable, whom employers of labour shun.

After he has been vaccinated, whether he likes it or not, the recruit is taken in hand by various corporals and sergeants, and his physical powers are developed to an extent that is surprising to himself and to those who have seen him in the chrysalis state. That "the backbone of the Army is the N.C. man" is well exemplified at a *dépôt*. In the barrack square and at the gymnasium, squads of recruits may be seen being put through a series of graduated exercises; being taught to walk, to run, to jump, to prance like a high-stepping horse, and crawl like a snake; to develop their upper limbs by various exercises with a dummy rifle; with one rifle, with two; to pull themselves up to a bar, and go through various gymnastic exercises. As a result of three months' training, the recruit gains in weight and height, girth of chest and limbs. The improvement in physical development is so great that one often regrets that a similar training cannot be more universally applied, and that more of the Hooligans and youthful yahoos that infest some of the streets of our cities cannot be seized by a discerning press-gang, trained to habits of order and discipline, and their physical powers developed. Still, important and beneficial as it is, this forced physical culture will not supply the place of natural stamina and hardihood. Up to a certain point gymnastic exercises are of great service in increasing our physical powers. Both boys and girls who live in towns, and to whom exercises in the open air are debarred, should have a regular gymnastic training by a competent instructor. But when carried to excess the muscular system is developed at the expense of vitality. A regiment of Sandows would be magnificent on parade, and in a *mêlée* or bayonet charge would carry all before them, but whether they would stand the hardships and privations of a campaign as well as a regiment of Canadian lumber men (could those hardy toilers be disciplined) is doubtful. The regiment of gladiators of the time of Vitellus Cæsar, idealised by Whyte Melville, had a real existence, and died like rotten sheep in the way described when they were exposed to the hardships of war. On the whole, the raw material of the Army, what I have seen of it at least, is not quite so bad as many pessimists who speak of "regiments made up of immature lads" and so forth would have us believe. Still, it is far from what it ought to be (considering what we have to pay for it). There are many degenerates in it. It would be found wanting in quantity certainly, were we to engage in a war with a combination of civilised Powers, or (possibly) with a single Power whose armament was up to date, who was well provided with the destructive appliances of modern warfare, and had the skill to use them. Our work would be cut out had we to defend from attack by such as these some of the large and scattered portions of the globe over which the British flag flies. Quantity alone will not suffice. It must be combined with quality. "The thicker the hay the easier it is mowed" (a sentiment with which another Barbarian may coincide) was the contemptuous reply of the Barbarian chief to the Roman ambassador, who boasted of the number of men who

would be brought up against the army of the Goths. "If there be any man willing to fight for honour," was the grim reply of the Highland chief, who wanted a recruit, "the price will be enough. And I want not the services of a fellow who draws his sword for gold alone."

We talk of the past, and how we have generally come out of battle broils. The memories of the past belong to the past. "The race which looks back, resting upon its ancient deeds, reposing on its recollections, dreaming of its ancient renown, the race or the individual who does so is infallibly lost." "Onwards," is the word; to look back is to invert the order of Nature, to wither and to die. We have chronicles of the deeds of the grand old armies of Marlborough and Wellington; we boast of them, and form more or less true conceptions of what they were like. Their material remains are a few old colours, antiquated uniforms and accoutrements, and obsolete weapons in museums and armouries. Our recent successful little wars have been against uncivilised races, armed with crude and primitive weapons, or unable to use the modern ones they have got hold of. We have pitted against these very carefully selected and trained British regiments, backed by large contingents of alien mercenaries, all well officered and provided with the best approved modern armament. Could the result be doubtful? Such a force is not a sample of our whole Army. It was the practice of the Mahratta soldiers, Indian historians tell us, to ride out in front of their companies before an engagement, challenge the British officers to single combat with sword and spear, and generally overcome them. The Mahratta regiments were not made up of such as these, they were exceptional. Why should it be so difficult to recruit the rank and file of the Army with suitable men, in spite of the greatly improved condition of the soldier? If we examine the state of other occupations, which, under right conditions promote the vigour and hardihood of the race, we find they are shunned and avoided. The callings of the agricultural labourer, of the sailor, are shirked and neglected. To get our lands well cultivated, to get our mercantile marine well manned with that almost extinct species—the true British sailor—are problems which attract the attention of thinking men who have the welfare of the nation at heart. The working boys and men do not think these are good enough, and look out for softer snaps, *i.e.*, better pay and shorter hours. Soldiering is a trade, also, which has always been despised by the Anglo-Saxon, as unworthy of a free man. He will fight, and fight well. But he dislikes discipline, and does not love the military, except occasionally in an uncertain and indiscriminating fashion.

Charles Kingsley, a typical Anglo-Saxon, expresses this sentiment in one of his books:—"A manservant, a soldier, and a Jesuit are to me the great wonders of humanity; three forms of moral suicide for which I never had the slightest gleam of sympathy or comprehension." This about "sizes" it. The average Anglo-Saxon dreads the Jesuit, dislikes the soldier, and despises the flunkey.

Again, the Army is still supposed to be a "class" institution with class emoluments; the plums are unequally distributed, it is thought. Lowell has told us:—"The gin'als get the biggest sheer, the kunnles next,

and so on We never gut a blasted mite o' glory ez I know on; an' 'spose we hed, I wonder how your going to contrive its division, so's to give a piece to twenty thousand privits?"

The country has become democratic, and few look on the Army as a desirable career. Many more opportunities to emigrate are now open to the turbulent, the unruly, or the dissatisfied man, who can find no opening for his talents at home in the old country. Competing series of steamships carry him easily and at comparatively small cost to Australia, to South Africa, Canada, or wherever he may place the promised land, where wages are high and land is cheap. Often he finds it quite otherwise from what his fancy painted it. But he stays and makes the best of it, or he stays because he can't get away, or he drifts aimlessly. Seldom does he return. Occasionally "His Magnificence," who has made his pile as a Ward Politician, astonishes the village of his birth in the Emerald Isle by displaying his grandeur for a season to the inhabitants of Ballyslachguthery. Once, such as he would have listed; now they scorn the blandishments of the recruiting sergeant. All these are reasons why it is so much more difficult to supply the rank and file of our Army with suitable recruits. Within my remembrance, the old recruiting sergeants would have laughed at the recruits who are now accepted and passed into the Army. The Army of the past had many blackguards in it no doubt, but it had fewer degenerates; the species was almost unknown then. We infer that there was more of the fighting spirit in the blackguards than in the degenerates, and it is the "spirit" that we must look for in the raw material from which our soldiers are made. "Care I for the thews, the sinews of a man. Give me the Spirit, Master Shallow," said the old Knight.

Let us hope the spirit of Corporals Trim and Gregory Brewster may be found in the "specials" of the present day.

Major-General F. M. BIRCH (I.S.C.):—I have followed the lecturer with much interest, but I am bound to say that I do not agree with him in a good deal. The deep thought and the high philosophy I put on one side. I have some little experience in this town with regard to the Poor Law, and it seems to me that behind this deficiency of the physique of our recruits lies the important fact that a large part of our population is under-fed. We have too many in this country, and we cannot find employment for them, and it is very sad to think how these children grow up. Born from mothers who are not sufficiently nurtured themselves, they do not get sufficient nourishment in their infancy, and throughout their childhood remain in an emaciated state, which it is quite pitiable to observe. It may be quite true, as the lecturer has said, that there are other openings for employment which naturally would attract those who are able to fill them; but I am bound to say that I think there remains a spirit in the nation which in time of trouble, such as is existing now, would bring young men forward in all requisite numbers to fill the ranks of the British Army, and whatever may be the physique of these recruits—I am sorry it is not better—still Tommy Atkins has shown in every recent war that he can stand up to any man that can be brought against him, however courageous and however disciplined—well, I do not know about discipline, but at any rate well-trained, for these Boers are certainly good shots. The recruit has never shown himself wanting in any war as yet, I am thankful to say, that has required the interference of the British arms. I have not very much knowledge of the English recruiting, for my service has been in India; but I have heard that the recruits' characters are very much

inquired into when they come into the Army, perhaps almost too much so. There are men who have a grand spirit—perhaps too high-spirited young men—who have come to grief elsewhere, who are quite willing to jeopardise their lives and to take up a soldier's profession. I have a son-in-law who is a recruiting officer, and from his conversation—he did not tell me this, and so I must not quote him as an authority—from his conversation it occurred to me that we were too particular in the quality of recruits we take. I can only say that although democracy does pervade the atmosphere, it has not come into England yet, thank God. The quotation from the American author does not at all, to my mind, show the actual state of feeling in England, and in many other particulars I disagree with the lecturer

Major-General E. PEMBERTON LEACH (R.E.):—I should like, with your permission, Sir, to endorse the remarks that have fallen from the last speaker. I think that many in the audience will be extremely sorry to have listened to the very sorry picture that has been drawn by the lecturer of the recruits of the British Army from a *dépôt* medical officer's point of view. I can only speak as an engineer officer, and will confine my remarks to my own branch of the Service. The Royal Engineers are certainly recruited from a fairly representative class of the community, although I am perfectly willing to admit that the higher rate of pay necessarily attracts a better stamp of recruit. Officers constantly meet in various parts of the country in good situations men who have served under them in the field, and by whom they are gladly recognised. The lecturer has brought forward many points to show how the recruit enters the Service. No doubt there are amongst them *ne'er-do-weels*; no doubt there are men who are pressed by want, by a fall in the labour market, or by other causes. Many of them, no doubt, show slight physique; but such instances are the exception, not the rule. The gymnastic training referred to by the lecturer is excellent, and is equally useful to the trained soldier. I shall leave in your hands, Sir, one or two other points to which the lecturer has referred.

Major C. E. FAUNCE (R.A.M.C.):—From the medical officer's point of view, I think as regards the point Colonel Douglas mentioned with reference to the number of rejections, that a great many of those rejections are due to the recruits not coming up to the standard weight—the standard minimum weight of 115 lbs. There is no discretion left to the medical officer at the *dépôt* whether he should pass a man or not. The medical officer might be able to judge that a man's loss of weight is due to the fact that he has not been properly fed, and the medical officer may know that perhaps in a short time, by the good feeding at the *dépôt*, he would get up to the required weight; but there is no discretion left to him. We lose a large number of recruits in the Army in this way. There are a number of recruits who are passed in shown as weighing the minimum weight who are found not to come up to it when they arrive at the *dépôt*. This, of course, is of great importance, because afterwards the weight which the recruit is said to weigh when he enlisted is entered in all his documents, and when he goes away to another station he may get ill. Then he is weighed again and he is looked upon as having lost a great quantity of weight, when he has really not done so at all. There are lots of tricks by which recruits are brought up to the minimum standard of weight, such as filling them up with cold water before they are weighed. I think it should be left to the discretion of the medical officers whether they should enlist a man who is a little below the weight, and if that were done we should save a lot of men. I had a good example of this some time ago. There was a recruit who joined at Hounslow, who was shown as weighing 116 lbs. I could only make him weigh 106 lbs. I intended to have kept this recruit at Hounslow *dépôt* for some time to see if he could be brought up to the proper weight. I happened to go away to some manoeuvres, and when I came back the recruit had gone. A short time afterwards I was sent to Malta. When I arrived there, amongst the number of patients who were handed over to me I found my friend the recruit of 106 lbs. The medical

officer in charge had invalidated him because he said, "Here is a recruit who has lost 10 lbs. since he enlisted." The fact was this recruit ought never to have been admitted; his loss of weight was due to his general bad physique. A number of recruits enlisted under the weight have promptly made up their weight after the training they got at the *dépôt* and with the good food, etc. I think if we medical officers were left a little more discretion in that way, we should prevent the rejection of a lot of men who would make useful soldiers afterwards.

Lieut.-Colonel Lord RAGLAN (Royal Monmouthshire Engineers, Militia):— I should like to emphasise what the last speaker has said. To my mind this question is purely a medical question. As for laying down a hard and fast rule as to what a man should be, I think it is a very great mistake, and that it should be left entirely to the doctors who examine him. I would go farther than that. I would leave the question of age entirely to the doctor. At the present moment we lay down a hard and fast rule that a man must be eighteen, but everyone knows as well as possible that very few recruits are eighteen. A man tells you a lie with his tongue in his cheek, and you know he is telling a lie, and he knows that you know he is telling a lie, but under the present conditions you are bound to take him. I say that I should sweep away all restrictions of any sort. All I want for a soldier is a man who is physically capable to do a certain amount of work, and the proper judge of that is the doctor. There is one point I should like to call the lecturer's attention to. He has given us rather a dreadful account of recruits that we get nowadays. In the last fifty years there has grown up in the United Kingdom a very large force of men, the police, who are the class who enlisted fifty or sixty years ago, and the case is the same with many other trades. I should like to say one word as to what the average recruit is before he comes to enlist. Nowadays you get the bulk of your recruits from the towns. Nearly all the boys in towns are in employment of some sort—errand boys, or messenger boys, or something. The boy lives at home; he draws his 4s. or 5s. a week, which his mother "collars" after a scuffle on Saturday afternoon. When he gets a little older he begins to feel the want of more money. He begins to walk out with his young lady. He gets tired of the weekly battle for the 5s. with his mother, and he says to his employer that he wants a man's wages. The employer says "You are only doing a boy's work, and I can get any amount of boys to do your work!" The boy says "Very well, I shall chuck my job and go and get a man's wages!" That boy goes out into the street and he casts about for work. He may get work; he may not. If he does not get work he probably drifts to the barracks; and that is the history of the bulk of the recruits that join, anyhow in the larger towns. I do not see that you have a right to expect that these boys—brought up as they are, very young, very backward in development—should have the physique which you would like to get, or you should get, in men who are fit to go through a campaign.

Lieut.-Colonel U. J. BOURKE (R.A.M.C.):—I came here with a view of hearing something from a brother medical officer with regard to recruits. The lecture has been replete with rhetoric, etc., but I am afraid we have not got any practical ideas from it. As an officer on the Active List, I should like to dissociate myself from the tone of the remarks that the lecturer has made with regard to recruits. A special recruit is not exactly what you want, but he is a very near approach to it. You take him in, feed him well, and give the gentle gymnastic exercise that he is getting now, and he will turn out a valuable man in time. The question of standards has been mentioned, and the lecturer compares the American student with the British recruit. But you must remember that there is three years difference between them. If you took a British recruit at the age of the American student, I am sure he would do far more justice to the Service in the time.

Dr. DOUGLAS:—That is what I say. I say that the chief cause of the imperfect development of our recruits is the immature age at which they enlist. I think I said that in my lecture.

Lieut.-Colonel BOURKE :—Yes ; but the lecturer has taken the American student of 22 years of age and the British recruit at 19, and has asked us to compare them side by side to a certain extent.

Colonel F. C. KEYSER, C.B. (late Royal Fusiliers):—I think there is one way in which we ought to utilise our under-sized men, whom we now allow to go to waste and do not enlist at all—they would make *beau-ideal* mounted infantrymen. They are light, they are active; they are the men who generally have been employed in racing or other stables, and who, for various reasons, because they have got too heavy or something of that sort, want some other employment. They are the very men we ought to take for our mounted infantry. At present, when mounted infantrymen are wanted, the commanding officer is ordered to supply a certain number from his regiment to train at Aldershot, and he is so limited in his scope of choice that very often he has to take his very best men. Sometimes the right-hand man of all his companies goes away in order to be trained as mounted infantry. I look upon that as a decided waste. These men as mounted infantry are put on big cavalry horses, which is also a mistake. Mounted infantry, to my mind, should be wiry, nippy little fellows mounted on 14-hand ponies, on which they could get on and off without assistance, and those ponies would carry them quite as well as horses. We should then be able to utilise a very large body of men who at present go absolutely to waste, who are longing to go into the Army, but because they are below a certain standard in height only, not in chest measurement or in any other way, are not allowed to do so.

Surgeon-General H. S. Muir (Deputy Director-General, Army Medical Service):—I think I might say on the general question of recruits that the whole point is, What is the minimum physical standard that we want to attain to? The point bristles with difficulties. As far as I can see, we go back to different ages, and different times, and different nations. What we want to attain is the minimum efficiency that we ought to have in the British Army as a type of Briton—not as a type of the world—but as a type of Briton. I am in a position to say that there are enquiries on foot, and we hope shortly to have a standard which will be more adaptable, and perhaps lead to greater success in producing the supply which the demand needs. Such a question, for instance, as weight; it is perfectly intelligible. The recruit comes to us half starved. In a few weeks he will put on almost 10 lbs., and if, as a speaker has said, it is left to the medical officer (who ought to be a good judge) whether such and such a man will attain development in a few weeks, that man ought to be taken whether he is below the standard or not. The point is that we want a better guide; we desire to have an accurate table of “physical equivalents”; and I hope that object will soon be attained. As to the recruit's height, it is a different question altogether. The speaker who preceded me speaks of short men being enlisted specially for mounted infantry. That appears to me to be quite reasonable; but when the argument is brought forward that Goorkhas—being little men—are able to shoot as well as tall men, and that we ought to enlist shorter men than we do in the Army generally, we must recollect that the British type of manhood differs from that of the Nepaulese. It is, then, moot point whether the present standard of height should be reduced; and I hope the question will be decided before long by anthropological experts and practical soldiers.

Lieut.-Colonel DOUGLAS, in reply, said :—I am sorry to find myself very much in the minority, but it is a predicament in which I have often been. I have endeavoured to describe the recruit as he is actually. What my conceptions of him are is another matter. I do not mean to imply that the recruit who told me that he enlisted because he “took a notion” was a bad recruit—quite the contrary. I said in fact that these were the most desirable recruits. The undesirable ones are those who are compelled to enlist by want. I fear there are a great many of them. How many, one cannot estimate. It is only my conception that I give, when I say that there are a great many of them. As regards increased enlistment

in time of war, all I can say is, that up to this time I have not seen it in the northern depôt where I have the honour to examine recruits. I must say there are a better class of recruits coming forward, but the number has not, as far as I know, increased lately. It is some time since I referred to that quotation from Kingsley, but as far as I remember he gives it as his sentiment—or one with which he has sympathy. Some sage has observed that he never knew an explanation that did not require more explaining than the original difficulty. Nevertheless, I will endeavour to elucidate a few points that would seem to require explaining in this paper on the recruit. My observations apply to the raw material of the Army as I see it—not to the material after it has been trained, and disciplined, and drilled into fighting-men. The inference, of course, is, that the quality of the rank and file is affected by the indifference of some of the raw material. How much, how little, this is the case, it would be very difficult to ascertain. It may be that the question can only be solved by our having to meet in warfare the army of a first-rate European Power. Assertions that my observations were a “libel on the British Army,” references to the “soldiers who stormed the heights of Dargai, Glencoe, and Elands Laagte,” etc., are beside the question; I spoke of such as these in my lecture. My observations have been chiefly of the recruits of the North of England and Scotland. Of the youth recruited in London and the vicinity, who forms so large a part of the raw material of the Army, I have seen but little. At one depôt where I was stationed for some years, many recruits were sent down from London to fill vacancies, for which the district did not supply enough recruits locally. I have also visited the recruiting office at St. George’s, but not on duty. My conception of the London recruits is, that they are rather mixed, and something like the figs of the pessimist prophet: “One basket had very good figs, even like figs that are first ripe; and the other basket had very naughty figs, which could not be eaten, they were so bad. Then said the Lord unto me, ‘What seest thou, Jeremiah?’ and I said, ‘Figs; the good figs very good, and the evil very evil, that cannot be eaten, they are so evil.’” As far as I have gone in my examination of the raw material of the Army I have come to these conclusions: that the greater part of it is town-bred—the agricultural population yields but a small number of recruits; that many of these town-bred youths enlist, as a last resource, compelled to do so by want and hunger; and that their physique is below the average of the youthful manhood of the same ages. How many of these there may be, what proportion they bear to those who enlist from choice, it would be hard, if not impossible, to determine. I base my conclusions on the appearance and physical condition of the youths, and the answers I receive to my enquiries, as to the cause of their enlisting. Statistics, giving the number of recruits enlisted, of those accepted and rejected, their height, weight, age, etc., are sufficiently accurate. Those relating to their previous occupations must be accepted with a certain amount of reserve. For instance, in my own experience, a youth, whom I knew to be a “sale’s clerk” in a store, when he came up for examination for enlistment, was returned as an “engineer,” a couple of golf caddies as “labourers,” a dock loafer as a “seaman,” etc. Of course, it is nearly impossible to verify each youth’s statement as to what he has worked at, or whether he has worked at all. “Between vague, uncertain, ‘capability’ and fixed absolute performance, there may be a great gulf.” Lastly, may not the observations of an elderly medical officer of some experience of life in its various phases, who would probably better serve his interests by keeping silent, who has no cause to grumble, no reason to speak ill of a Service which has treated him better than he deserves, carry some weight, beside the opinion of those, who as far as he knows, see but little of the soldier in the chrysalis stage, and who may picture to themselves ideal recruits, quite different from the real ones. *Uterum creditis Romani?* Which of the two will you believe, oh Britons?

Colonel CARLETON:—Charles Kingsley said that food for powder unfortunately required to be very good food.

The CHAIRMAN (Major-General J. F. Maurice) :—I think that it is exceedingly valuable to us to have a question of this kind brought before us in the most complete form it can be, and I may say that without partiality, favour, or affectation, because I do not think I have ever passed through such an unpleasant hour as I have in listening to my friend Colonel Douglas. We are told on high authority that such discipline is good for one. I am bound to say it may have been very improving, but it certainly was very severe. I scarcely agree with any single syllable that he said from the beginning of his lecture to the end. As for his main point, the spirit which he says is wanting in the British race—

Colonel DOUGLAS :—No. Martial spirit may be wanting in *some of the recruits*.

The CHAIRMAN :—It is wanting, surely, according to your statements, in the race. Let me take the lecturer's quotations. It seems to me they represent the mistake he made throughout his lecture. He quoted from Charles Kingsley, but Charles Kingsley was a dramatist, and in that quotation he is representing a particular type of character—a tailor. It does not bear a trace of Charles Kingsley's own opinions. I knew Charles Kingsley well. There was no man who loved soldiers more, and there was no one whom soldiers loved more. But he was much too good a dramatist not to be able to put into other men's mouths that which he in no way shared himself. The lecturer has quoted these long passages of forty years ago, and he says we are to judge of the present by them. Heavens! Haven't we had enough in the last two or three years to disprove that? Is Dargai nothing? Is what has been going on in South Africa nothing? Is it not a question of to-day what the British soldier is? Somebody said in one of the papers—and I am bound to say I agree with him from all I have ever seen of fighting—"Give me Tommy Atkins to lead, and you may have anybody else you like." As to the question of the motives that induce people to enlist, the author says they enlist for gold. Because the men come in and take the very lowest pay you can possibly give to a man to live upon, the lecturer says they enlist for gold. That simply means that we do not compulsorily enlist; but the lecturer does not suggest that we should go in for compulsory enlistment. As to the tendency of the country and the readiness of the men whom we enlist, when 80,000 men a year come and offer themselves for enlistment, surely that has a most important bearing on the extent to which the Army does still possess attractions for the Anglo-Saxon. And it is a yet more striking fact that the recruiting has doubled within the last few weeks—it has more than doubled, it has nearly trebled since active service began. The thing which the Anglo-Saxon does not like is the ordinary life of a soldier in peace-time. It is very natural that he should not like it as long as he only knows it through these expressions of Kaye's and the like, quoted in the country by people who have known nothing of the Army for years, wrongly impressing the public, influencing mothers and influencing the clergy. Of course, as long as you have *them* dead against you there will always be a reluctance of a certain kind to enlist for the ordinary work of a soldier in peace-time. But we have never yet had the slightest objection on the part of the Anglo-Saxon to enlist during war. The moment war breaks out he wants to go. Unfortunately, the difficulty is to persuade him that he has to be trained for war. What is the lecturer's own story of the question he puts to the recruits? He asks them, "What makes you enlist?" It is a matter of absolute astonishment on the lecturer's part that anybody should be such an utter fool as to enlist. He does not mean to put it to the recruit in that way, but he has the consciousness that it is so. Remember this: the Briton—not the soldier only, but the Briton—is a dumb animal. We always have been so. All the valour of the Briton has been dumb valour. The lecturer asks the recruit this question, and gets the answer, "I took a notion." The recruit is ashamed to say, "I enlisted because I wished to fight for my country." It is not in the nature of the Briton to say that; he is much too modest. He does not like to come out with high-falutin terms; he hates it, and he will find any excuse not

to say it. Why did he not come a few weeks ago, and why does he come now? He comes because he wants to fight. The reason he does not come in peace-time is that he has an impression of the nature of the Service and of the nature of the men whom he will meet there, which is produced by such slanders as those of Kaye's, and by the wrong ideas prevailing in the country, which were started in the last century by people—I cannot put into language what I think of them; I dare not trust myself—who emptied the gaols into the Army, and of course we have never got over the impression which that created among a large portion of the population. They gave us gaol-birds instead of yeomen, whom we had had up to that time, and we have still to shake off the bad impression created by that fact. As regards the quality of the recruit that we get, we are always fighting to improve it, and in proportion as we get rid of such slanders as those of Kaye's, in proportion as we get people who do not take the view that the lecturer does of the recruit, so shall we get the men we want to come in. It may well be that we shall have to offer yet greater inducements—we cannot go on improving the conditions we offer to the recruit too much. But when the country is in such a humour as it is at present I cannot admit that the Anglo-Saxon shows any signs of not liking the soldier. It has always been the case in every country that when there is war the soldier is loved. The Anglo-Saxon always imagines his is going to be the most peaceful country in the world, but he is always going to war. During peace-time he imagines he does not want the soldier, because he is going to be such a peaceful animal and won't quarrel again; he hates to pay for no purpose at all. But at the present moment it seems to me that the whole country is simply teeming over with regard for the soldier. I do not think that the lecturer's representations come into it at all. When you come to the practical details of the question, I admit that there are a number of points that need improvement. The lecturer talks about men, but he omitted one whole class in the Army—the best class—that is, the boys. If the feeling of dislike of the Army by those who serve in it, which has been asserted by the lecturer to exist, were something real and not an outside impression—an impression which is representative of the very spirit that is our great difficulty—why is it that the very best recruits we get are the sons of old soldiers, who come to us year after year? In every branch of the Service that is so. So far from having any difficulty in recruiting the sons of those who know the Army best, we cannot take much more than a third of the boys whom we could enlist if we were able to take them. They come in and make our very best soldiers, and that is proof positive that it is not something inside the Army, but a general vague impression outside that stands in our way. The 80,000 recruits who offer themselves every year—a most extraordinary fact, which you would not get in any other country in the world—are not all of the best type, but when war breaks out then the recruits that come in are splendid. As General Leach and Colonel Keyser have pointed out, the question of size and everything of that kind is almost entirely one of the particular branch of the Army that you require a man for. I have never been able to understand why you want for an infantry soldier at the present day anything more than stamina, power of endurance, health, strength, good teeth and eyesight, and all that kind of thing, but what is the use of a huge man in the practical conditions of fighting I am absolutely unable to understand. Nor do we want it in the least for drivers in the artillery. On the other hand, we do want large gunners, because they have to lift heavy weights, which small men could not do. Then with regard to mounted infantry, it seems to me that what Colonel Keyser says is true. You can do with a very much smaller man provided he has strength and health. Colonel Bourke made a point I had intended to make about the comparison of those two men—the Englishman and the American recruits. There was a serpent lying hid beneath that comparison, which I have just got from Dr. Douglas. His great idea is that we enlist our recruits too young. The answer to that is, that with voluntary enlistment we

have to take the men when we can get them. It would be very nice to do what the Germans do, viz., go into the country and say we are going to have all the men at 20 and 21 years of age unless they are not up to the standard. But we cannot get them at that age before they have passed into trades in the country, we could only get the failures of other trades. If we enlisted at 20, 21, or 22, everything that Dr. Douglas says would be true. As boys you can get them, because they want to go into the Army. As they get older and older they get more settled in trade, and you can only get the ne'er-do-wells and make-shifts. That phrase "I took a notion" is a much more representative fact with a good many of them than Dr. Douglas at all realised; he should give credit for something beneath it. It means a real love of an adventurous career, and the thought that he is doing work for England, and has a pride in England. I think that is much nearer the mark than Dr. Douglas's view. Dr. Douglas speaks of our recent gymnastic exercises, and of the Sandow system in particular. I am sure everybody who has watched it will support everything General Leach has been saying. As far as my observation goes, anything more splendid than the effect of the training in the infantry depôts at the present time on the recruit cannot be conceived. I have been fighting all I know to get the same principle—at least three months for that development—applied to the artillery recruit, although he has nothing whatever to do with the absolute exercises afterwards. It means health, strength, and everything else. I look upon that gymnastic training as in every respect the best preparation for making warriors that we can have. The lecture has been exceedingly valuable to us, because it has brought out so excellent a discussion, and such perfect unanimity in rejecting the conclusions of the lecturer.

Colonel G. CARLETON (late R.A.):—With your permission, Sir, I should like to say something with reference to your own remarks now. I was one of the officers during the Crimean war authorised to enlist men for the Osmanli Horse Artillery. I had 160 recruits at Woolwich; they were some weeks there in camp, quite young fellows. Every man wishing to enlist had to come with a satisfactory character, enlistment was for two years, and, if required, the term was to be prolonged for one year more. Every candidate had also to be able to ride. There was, with the exception of the ordinary limits as to age, particulars of which I do not now clearly recall, no other qualification, so far as I remember. The recruiting officer had only the power to choose men of suitable and limited height and weight. Each man got 2s. a day pay with uniform and rations free. Any number of men could have been had with the above qualifications, I suppose. The recruiting was stopped in three weeks. There were more men than were wanted. I had a crowd of respectably dressed young fellows about the house where I was living in Dublin, that is, after three or four days when the Government offer became more known; but when I first went to the different livery stables and read the terms above stated, I was, I could see, not fully trusted, the terms were considered too good to be true. I relieved an officer at Woolwich, who was in charge of a large number of recruits already enlisted in London; he told me he had promised leave to go home and say good-bye to their relations to nearly all the young fellows he left with me, and he hoped I would let them go. I did so, and advanced them the money to pay their railway fare in some cases, and to several I advanced small sums besides to leave with their parents. I explained to all who thus got leave the serious position I should be in if they did not return at the end of the two or three days they had leave for. Not one of them disappointed me.

The CHAIRMAN :—That was in war-time, I think you said?

Colonel CARLETON :—Yes. I give this, Sir, as corroborative of your remarks about the impulse to recruiting that war gives in our country.

OPENING ADDRESS BY SIR WILLIAM WHITE,
K.C.B., LL.D., F.R.S., PRESIDENT OF THE
MECHANICAL SCIENCE SECTION OF THE
BRITISH ASSOCIATION, DELIVERED AT
THE MEETING OF THE ASSOCIATION, AT
DOVER, ON 15TH SEPTEMBER, 1899.

IN this address it is proposed to review briefly the characteristic features of the progress made in steam navigation; to glance at the principal causes of advance in the speeds of steam-ships and in the lengths of the voyages on which such vessels can be successfully employed; and to indicate how the experience and achievement of the last sixty years bear upon the prospects of further advance.

There is reason to hope that this choice of subject is not inappropriate. From the beginning of steam navigation the British Association in its corporate capacity, by the appointment of special committees, and by the action of individual members, has greatly assisted the scientific treatment of steam-ship design. Valuable contributions bearing on the resistance offered by water to the motion of ships, the conduct and analysis of the results of steam-ship trials, the efficiency of propellers, and cognate subjects have been published in the Reports of the Association. Many of these have largely influenced practice, and most of them may be claimed as the work of this section.

On this occasion no attempt will be made either to summarise or appraise the work that has been done. It must suffice to mention the names of three men to whom naval architects are deeply indebted, and whose labours are ended—Scott Russell, Rankine, and William Froude. Each of them did good work, but to Froude we owe the device and application of the method of model experiment with ships and propellers, by means of which the design of vessels of novel types and unprecedented speeds can now be undertaken with greater confidence than heretofore.

As speeds increase, each succeeding step in the ascending scale becomes more difficult, and the rate of increase in the power to be developed rapidly augments. Looking back on what has been achieved, it is impossible to overrate the courage and skill displayed by the pioneers of steam navigation, who had at first to face the unknown, and always to depend almost entirely on experience gained with actual ships, when they undertook the production of swifter vessels. Their successors of the present day have equal need to make a thorough study of the performances

of steam-ships both in smooth water and at sea. In many ways they have to face greater difficulties than their predecessors, as ships increase in size and speed. On the other hand, they have the accumulated experience of sixty years to draw upon, the benefit of improved methods of trials of steam-ships, the advantage of scientific procedure in the record and analysis of such trials and the assistance of model experiments.

Steam-ship design to be successful must always be based on experiment and experience as well as on scientific principles and processes. It involves problems of endless variety and great complexity. The services to be performed by steam-ships differ in character, and demand the production of many distinct types of ships and propelling apparatus. In all these types, however, there is one common requirement—the attainment of a specified speed. And in all types there has been a continuous demand for higher speed.

Stated broadly, the task set before the naval architect in the design of any steam-ship is to fulfil certain conditions of speed in a ship which shall not merely carry fuel sufficient to traverse a specified distance at that speed, but which shall carry a specified load on a limited draught of water. Speed, load, power, and fuel supply are all related; the two last have to be determined in each case. In some instances other limiting conditions are imposed affecting length, breadth, or depth. In all cases there are three separate efficiencies to be considered: those of the ship, as influenced by her form; of the propelling apparatus, including the generation of steam in the boilers and its utilisation in the engines; and of the propellers. Besides these considerations, the designer has to take account of the materials and structural arrangements which will best secure the association of lightness with strength in the hull of the vessel. He must select those types of engines and boilers best adapted for the service proposed. Here the choice must be influenced by the length of the voyage, as well as the exposure it may involve to storm and stress. Obviously the conditions to be fulfilled in an ocean-going passenger steamer of the highest speed, and in a cross-Channel steamer designed to make short runs at high speed in comparatively sheltered waters, must be radically different. And so must be the conditions in a swift sea-going cruiser of large size and great coal endurance, from those best adapted for a torpedo-boat or destroyer. There is, in fact, no general rule applicable to all classes of steam-ships—each must be considered and dealt with independently, in the light of the latest experience and improvements. For merchant-ships there is always the commercial consideration, Will it pay? For war-ships there is the corresponding inquiry, Will the cost be justified by the fighting power and efficiency?

CHARACTERISTICS OF PROGRESS IN STEAM NAVIGATION.

Looking at the results so far attained, it may be said that progress in steam navigation has been marked by the following characteristics:—

1. Growth in dimensions and weights of ships, and large increase in engine power, as speeds have been raised.

2. Improvements in marine engineering accompanying increase of steam pressure. Economy of fuel and reduction in the weight of propelling apparatus in proportion to the power developed.
3. Improvements in the materials used in shipbuilding; better structural arrangements; relatively lighter hulls and larger carrying power.
4. Improvements in form, leading to diminished resistance and economy of power expended in propulsion.

These general statements represent well-known facts—so familiar, indeed, that their full significance is often overlooked. It would be easy to multiply illustrations, but only a few representative cases will be taken.

TRANS-ATLANTIC PASSENGER STEAMERS.

The Trans-Atlantic service naturally comes first. It is a simple case, in that the distance to be covered has remained practically the same, and that for most of the swift passenger steamers cargo-carrying capacity is not a very important factor in the design.

In 1840 the Cunard steam-ship "Britannia," built of wood, propelled by paddle-wheels, maintained a sea-speed of about $8\frac{1}{2}$ knots. Her steam pressure was 12 lbs. per square inch. She was 207 feet long, about 2,000 tons in displacement, her engines developed about 750-H.P., and her coal consumption was about 40 tons per day, nearly 5 lbs. of coal per I.H.P. per hour. She had a full spread of sail.

In 1871 the White Star steam-ship "Oceanic" (first of that name) occupied a leading position. She was iron-built, propelled by a screw, and maintained a sea-speed of about $14\frac{1}{2}$ knots. The steam pressure was 65 lbs. per square inch, and the engines were on the compound principle. She was 420 feet long, about 7,200 tons in displacement, her engines developed 3,000-H.P., and she burnt about 65 tons of coal per day, or about 2 lbs. per I.H.P. per hour. She carried a considerable spread of sail.

In 1889 the White Star steamer "Teutonic" appeared propelled by twin screws and practically with no sail-power. She is steel-built, and maintains a sea-speed of about 20 knots. The steam pressure is 180 lbs. per square inch, and the engines are on the triple-expansion principle. She is about 565 feet long, 16,000 tons displacement, 17,000-I.H.P., with a coal consumption of about 300 tons a day, or from 1.6 to 1.7 lbs. per I.H.P. per hour.

In 1894 the Cunard steam-ship "Campania" began her service, with triple-expansion engines, twin screws, and no sail-power. She is about 600 feet long, 20,000 tons displacement, develops about 28,000-H.P. at full speed of 22 knots, and burns about 500 tons of coal per day.

The new "Oceanic," of the White Star Line, is just beginning her work. She is of still larger dimensions, being 685 feet in length and over 25,000 tons displacement. From the authoritative statements made, it appears that she is not intended to exceed 22 knots in speed, and that the increase in size is to be largely utilised in additional carrying power.

The latest German steamers for the Trans-Atlantic service are also notable. A speed of $22\frac{1}{2}$ knots has been maintained by the "Kaiser Wilhelm der Grosse," which is 25 feet longer than the "Campania." Two still larger steamers are now building. The "Deutschland" is 660 feet long and 23,000 tons displacement; her engines are to be of 33,000-H.P., and it is estimated she will average 23 knots. The other vessel is said to be 700 feet long, and her engines are to develop 36,000-H.P., giving an estimated speed of $23\frac{1}{2}$ knots. All these vessels have steel hulls and twin screws. It will be noted that to gain about 3 knots an hour nearly 50 per cent. will have been added to the displacement of the "Teutonic" the engine-power and coal consumption will be doubled, and the cost increased proportionately.

Sixty years of continuous effort and strenuous competition on this great "ocean ferry" may be summarised in the following statement:—Speed has been increased from $8\frac{1}{2}$ to $22\frac{1}{2}$ knots; the time on the voyage has been reduced to about 38 per cent. of what it was in 1840. Ships have been more than trebled in length, about doubled in breadth, and increased tenfold in displacement. The number of passengers carried by a steam-ship has been increased from about 100 to nearly 2,000. The engine-power has been made forty times as great. The ratio of horsepower to the weight driven has been increased fourfold. The rate of coal consumption (measured per H.P. per hour) is now only about one-third what it was in 1840. To drive 2,000 tons weight across the Atlantic at a speed of $8\frac{1}{2}$ knots, about 550 tons of coal were then burnt; now, to drive 20,000 tons across at 22 knots, about 3,000 tons of coal are burnt. With the low pressure of steam and heavy slow-moving paddle-engines of 1840, each ton weight of machinery, boilers, etc., produced only about 2-H.P. for continuous working at sea. With modern twin-screw engines and high steam pressure, each ton weight of propelling apparatus produces from 6 to 7-H.P. Had the old rate of coal consumption continued, instead of 3,000 tons of coal, 9,000 tons would have been required for a voyage at 22 knots. Had the engines been proportionately as heavy as those in use sixty years ago, they would have weighed about 14,000 tons. In other words, machinery, boilers, and coals would have exceeded in weight the total weight of the "Campania" as she floats to-day. There could not be a more striking illustration than this of the close relation between improvements in marine engineering and the development of steam navigation at high speeds.

Equally true is it that this development could not have been accomplished but for the use of improved materials and structural arrangements. Wood, as the principal material for the hulls of high-powered swift steamers, imposed limits upon dimensions, proportions, and powers which would have been a bar to progress. The use of iron, and later of steel, removed those limits. The percentage of the total displacement devoted to hull in a modern Atlantic liner of the largest size is not much greater than was the corresponding percentage in the wood-built "Britannia" of 1840, of one-third the length and one-tenth the total weight.

Nor must it be overlooked that with increase in dimensions have come considerable improvements in *form*, favouring economy in propulsion. This is distinct from the economy resulting from increase in *size*, which Brunel appreciated thoroughly half a century ago when he designed the "Great Britain" and the "Great Eastern." The importance of a due relation between the lengths of the "entrance and run" of steam-ships and their intended maximum speeds, and the advantages of greater length and fineness of form as speeds are increased, were strongly insisted upon by Scott Russell and Froude. Naval architects, as a matter of course, now act upon the principle, so far as other conditions permit. For it must never be forgotten that economy of propulsion is only one of many desiderata which must be kept in view in steam-ship design. Structural weight and strength, seaworthiness and stability, all claim attention, and may necessitate modifications in dimensions and form which do not favour the maximum economy of propulsion.

SWIFT PASSENGER STEAMERS FOR LONG VOYAGES.

Changes similar to those described for the Trans-Atlantic service have been in progress on all the great lines of ocean traffic. In many instances increase in size has been due, not only to increase in speed, but to enlarged carrying power and the extension of the lengths of voyages. No distance is now found too great for the successful working of steam-ships, and the sailing fleet is rapidly diminishing in importance. So far as long-distance steaming is concerned, the most potent factor has undoubtedly been the marvellous economy of fuel that has resulted from higher steam pressures and greater expansion. In all cases, however, advances have been made possible, not merely by economy of fuel, but by improvements in form, structure, and propelling apparatus, and by increased dimensions.

Did time permit, this might be illustrated by many interesting facts drawn from the records of the great steam-ship companies which perform the services to the Far East, Australia, South America, and the Pacific. As this is not possible, I must be content with a brief statement regarding the development of the fleet of the Peninsular and Oriental Company.

The paddle steamer "William Fawcett" of 1829 was 75 feet long, 200 tons displacement, of 60 nominal H.P. (probably about 120-I.H.P.), and in favourable weather steamed at a speed of 8 knots. Her hull was of wood, and, like all the steamers of that date, she had considerable sail-power.

In 1853 the "Himalaya" iron-built screw steamer of this line was described as "of larger dimensions than any then afloat, and of extraordinary speed." She was about 340 feet long, over 4,000 tons load displacement, 2,000-I.H.P. on trial, with an average sea-speed of about 12 knots. The steam pressure was 14 lbs. per square inch, and the daily coal consumption about 70 tons. This vessel was transferred to the Royal Navy, and did good service as a troop-ship for forty years.

In 1893 another "Himalaya" was added to the company's fleet. She was steel-built, nearly 470 feet long and 12,000 tons load displacement, with over 8,000-I.H.P. and a capability to sustain 17 to 18 knots at sea, on a daily consumption of about 140 tons of coal. The steam pressure is 160 lbs. per square inch, and the engines are of the triple-expansion type.

Comparing the two "Himalayas," it will be seen that in forty years the length has been increased about 40 per cent., displacement trebled, H.P. quadrupled, and speed increased about 50 per cent. The proportion of H.P. to displacement has only been increased as three to four, enlarged dimensions having secured relative economy in propulsion. The rate of coal consumption has been probably reduced to about one-third of that in the earlier ship.

The latest steamers of the line are of still larger dimensions, being 500 feet long and of proportionately greater displacement. It is stated that the "Himalaya" of 1853 cost £132,000 complete for sea; the corresponding outlay on her successors is not published, but it is probably twice as great.

On the service to the Cape similar developments have taken place. Forty years ago vessels less than 200 feet long and about 7 knots performed the service, whereas the latest additions to the fleets exceed 500 feet in length, and can, if required, be driven at 17 to 18 knots, ranking in size and power next to the great Trans-Atlantic liners.

Commercial considerations necessarily regulate what is undertaken in the construction of merchant-steamers, including the swift vessels employed in the conveyance of passengers and mails. The investment of £600,000 to £700,000 in a single vessel like a great Trans-Atlantic liner is obviously a serious matter for private owners; and even the investment of half that amount in a steamer of less dimensions and speed is not to be lightly undertaken. It is a significant fact that, whereas fifteen years ago nearly all the largest and swiftest ocean steamers were British-built and owned, at the present time there is serious competition in this class by German, American, and French companies. It is alleged that this change has resulted from the relatively large subsidies paid by foreign Governments to the owners of swift steamers; and that British owners, being handicapped in this way, cannot continue the competition in size and speed on equal terms unless similarly assisted. This is not the place to enter into any discussion of such matters, but they obviously involve greater considerations than the profit of shipowners, and have a bearing on the naval defence of the Empire. In 1887 the Government recognised this fact, and made arrangements for the subvention and armament of a number of the best mercantile steam-ships for use as auxiliary cruisers. Since then other nations have adopted the policy, and given such encouragement to their shipowners that the numbers of swift steamers suitable for employment as cruisers have been largely increased. Not long since the First Lord of the Admiralty announced to Parliament that the whole subject was again under consideration.

CARGO AND PASSENGER STEAMERS.

Cargo steamers, no less than passenger steamers, have been affected by the improvements mentioned. Remarkable developments have occurred recently, not merely in the purely cargo-carrier, but in the construction of vessels of large size and good speed carrying very great weights of cargo and considerable numbers of passengers. The much-decried "ocean-tramp" of the present day exceeds in speed the passenger and mail steamer of fifty years ago. Within ten years vessels in which cargo-carrying is the chief element of commercial success have been increased in length from 300 or 400 feet to 500 or 600 feet; in gross register tonnage from 5,000 to over 13,000 tons; and in speed from 10 or 12 knots to 15 or 16 knots. Vessels are now building for the Atlantic service which can carry 12,000 or 13,000 tons deadweight, in addition to passengers, while possessing a sea-speed as high as that of the swiftest mail steamers afloat in 1880. Other vessels of large carrying power and good speed are running on much longer voyages, such as to the Cape and Australia. In order to work these ships successfully very complete organisation is necessary for the collection, embarkation, and discharge of cargo. The enterprise and skill of shipowners have proved equal to this new departure, as they have in all other developments of steam-ships.

How much further progress will be made in the sizes and speeds of these mixed cargo and passenger steamers cannot be foreseen. The limits will be fixed by commercial considerations, and not by the capability of the shipbuilder.

In passing, it may be noted that while the lengths and breadths of steam-ships have been greatly increased, there has been but a moderate increase in draught. Draught of water is, of course, practically determined by the depths available in the ports and docks frequented, or in the Suez Canal for vessels trading to the East. From the naval architect's point of view, increase in draught is most desirable as favouring increase of carrying power and economy of propulsion. This fact has been strongly represented by shipowners and ship-designers, and not without result. The responsible authorities of many of the principal ports and of the Suez Canal have taken action towards giving greater depth.

Other changes have become necessary on the part of dock and port authorities in consequence of the progress made in shipbuilding. Docks and dock-entrances have had to be increased in size, more powerful lifting appliances provided, and large expenditure incurred. There is no escape from these changes if the trade of a port is to be maintained. The chief lesson to be learnt from past experience is that when works of this character are planned it is wise to provide a large margin beyond the requirements of existing ships.

CROSS-CHANNEL STEAMERS.

The conditions to be fulfilled in vessels designed to steam at high speed for limited periods differ essentially from those holding good in

ocean-going steamers. None the less interest attaches, however, to cross-Channel steamers, and in no class has more notable progress been made. It is much to be desired that at this meeting some competent authority should have presented to the Association an epitome of the history of the steam packet service between Dover and the Continent. I cannot attempt it. So far as I am informed, the first steamer was placed on this route in 1821, was of 90 tons burden, 30-H.P. nominal, and maintained a speed of 7 to 8 knots. She was built by Denny, of Dumbarton, engined by David Napier, and named the "Rob Roy." It is interesting to note that the lineal successors of the builder of this pioneer vessel have produced some of the most recent and swiftest additions to the cross-Channel service.

In 1861-2 a notable advance was made by the building of vessels which were then remarkable for structure and speed, although small and slow when compared with vessels now running. Their designers realised that lightness of hull was of supreme importance, and with great trouble and expense obtained steel of suitable quality. The machinery was of special design and relatively light for the power developed. A small weight of coal and cargo had to be carried, and the draught of water was kept to about 7 feet. Under then existing conditions it was a veritable triumph to attain speeds of 15 to 16 knots in vessels only 190 feet long, less than 25 feet broad, and under 350 tons in displacement. To raise the trial speed to 20 or 21 knots in later vessels performing the same service, whose design includes the improvements of a quarter of a century, it has been found necessary to adopt lengths exceeding 320 feet and breadths of about 35 feet, with engines developing 4,500 to 6,000-I.H.P., and with very great increase in coal consumption and cost. On other cross-Channel services between Dover and the Continent still larger and more powerful paddle-steamers are employed.

Another interesting contrast is to be found in the comparison of the steamers running between Holyhead and Kingstown in 1860 and at the present time. The "Leinster" of 1860 was 328 feet long, 35 feet broad, and rather less than 13 feet draught. Her trial displacement was under 2,000 tons, and with 4,750-H.P. she made $17\frac{3}{4}$ knots. She had a steam pressure of 25 lbs. per square inch and was propelled by paddle-wheels driven by slow-moving engines of long stroke. Her successor of 1896 is about 30 feet greater length, $6\frac{1}{2}$ feet greater breadth, and about 10 per cent. greater displacement. The steam pressure is 170 lbs. per square inch. Forced draught is used in the stokeholds. Twin screws are adopted, driven by quick-running vertical engines of the triple-expansion type. Very great economy of coal consumption is thus secured as compared with the earlier vessel, and much lighter propelling apparatus in proportion to the power, which is from 8,000 to 9,000-H.P. at the full speed of 23 knots. The hull is built of steel, and is proportionately lighter.

This is a typical case, and illustrates the effect of improvements in shipbuilding and engineering in thirty-five years. The later ship probably requires to carry no greater load of coal than, if so great as,

her predecessor, although her engine-power is nearly double. The weight devoted to propelling machinery and boilers is probably not so great. Thanks to the use of steel instead of iron, and to improved structural arrangements, the weight of hull is reduced in comparison with dimensions, and a longer ship is produced better adapted to the higher speed. Messrs. Laird, of Birkenhead, who built three of the "Leinster" class forty years ago, and have built all the new vessels, are to be congratulated on their complete success.

Between such vessels designed for short runs at high speed and requiring therefore to carry little coal, while the load carried exclusive of coal is trifling, and an ocean-going steamer of the same average speed designed to make passages of 3,000 miles, there can obviously be little in common. But equal technical skill is required to secure the efficient performance of both services. In the cross-Channel vessel, running from port to port, and under constant observation, conditions of working in engine and boiler rooms, as well as relative lightness in scantlings of hull, can be accepted which would be impossible of application in a sea-going ship. These circumstances in association with the small load carried explain the apparent gain in speed of the smaller vessel in relation to her dimensions.

INCREASE IN SIZE AND SPEED OF WAR-SHIPS.

Turning from sea-going ships of the mercantile marine to war-ships, one finds equally notable facts in regard to increase in speed, associated with enlargement in dimensions and advance in propelling apparatus, materials of construction, structural arrangements, and form.

Up to 1860 a measured-mile speed of 12 to 13 knots was considered sufficient for battle-ships and the largest classes of cruisers. All these vessels possessed good sail-power and used it freely as an auxiliary to steam, or as an alternative when cruising or making passages.

When armoured battle-ships were built (1859) the speeds on measured-mile trials were raised to 14 or 14½ knots, and so remained for about twenty years. Since 1880 the speeds of battle-ships have been gradually increased, and in the latest types the measured-mile speed required is 19 knots.

Up to 1870 the corresponding speeds in cruisers ranged from 15 to 16 knots. Ten years later the maximum speeds were 18 to 18½ knots in a few vessels. Since then trial speeds of 20 to 23 knots have been attained or are contemplated.

There is, of course, a radical distinction between these measured-mile performances of war-ships and the average sea-speeds of merchant-steamers above described. But for purposes of comparison between war-ships of different dates, measured-mile trials may fairly be taken as the standard. For long-distance steaming the power developed would necessarily be much below that obtained for short periods and with everything at its best. This is frankly recognised by all who are conversant with the war-ship design, and fully allowed for in estimates of sea-speeds. On the other hand, it is possible to point to sea trials made

with recent types where relatively high speeds have been maintained for long periods. For example, the battle-ship "Royal Sovereign" has maintained an average speed of 15 knots from Plymouth to Gibraltar, and the "Renown" has maintained an equal speed from Bermuda to Spit-head. As instances of good steaming by cruisers, reference may be made to 60-hour trials with the "Terrible" when she averaged 20 knots, and to the run home from Gibraltar to the Nore by the "Diadem" when she exceeded 19 knots. Vessels of the "Pelorus" class, of only 2,100 tons displacement, have made long runs at sea averaging over 17 knots. Results such as these represent a substantial advance in speed of Her Majesty's ships in recent years.

Similar progress has been made in foreign war-ships built abroad as well as in this country. It is not proposed to give any facts for these vessels, or to compare them with results obtained by similar classes of ships in the Royal Navy. Apart from full knowledge of the conditions under which speed trials are made, a mere statement of speeds attained is of no service. One requires to be informed accurately respecting the duration of the trial, the manner in which engines and boilers are worked, the extent to which boilers are "forced," or the proportion of heating surface to power indicated, the care taken to eliminate the influence of tide or current, the mode in which the observations of speed are made, and other details, before any fair or exact comparison is possible between ships. For present purposes, therefore, it is preferable to confine the illustrations of increase in speed in war-ships to results obtained under Admiralty conditions, and which are fairly comparable.

A great increase in size has accompanied this increase in speed, but it has resulted from other changes in modern types, as well as from the rise in speed. Modern battle-ships are of 13,000 to 15,000 tons, and modern cruisers of 10,000 to 14,000 tons, not merely because they are faster than their predecessors, but because they have greater powers of offence and defence and possess greater coal endurance. Only a detailed analysis, which cannot now be attempted, could show what is the actual influence of these several changes upon size and cost, and how greatly the improvements made in marine engineering and shipbuilding have tended to keep down the growth in dimensions consequent on increase in load carried, speed attained, and distance traversed.

It will be noted also that, large as are the dimensions of many classes of modern war-ships, they are all smaller in length and displacement than the largest mercantile steamers above described. There is no doubt a popular belief that the contrary is true, and that war-ships exceed merchant-ships in tonnage. This arises from the fact that merchant-ships are ordinarily described, not by their displacement tonnage, but by their "registered tonnage," which is far less than their displacement. As a matter of fact, the largest battle-ships are only of about two-thirds the displacement of the largest passenger steamers, and from 200 to 300 feet shorter. The largest cruisers are from 100 to 200 feet shorter than the largest passenger steamers, and about 60 per cent. of their displacement. In breadth the war-ships exceed the largest merchant steamers by five to

ten feet. This difference in form and proportions is the result of radical differences in the vertical distribution of weights carried, and is essential to the proper stability of the war-ships. Here we find an illustration of the general principle underlying all ship-designing. In selecting the forms and proportions of a new ship, considerations of economical propulsion cannot stand alone. They must be associated with other considerations, such as stability, protection, and manœuvring power, and in the final result economy of propulsion may have to be sacrificed, to some extent, in order to secure other essential qualities.

ADVANTAGES OF INCREASED DIMENSIONS.

Before passing on, it may be interesting to illustrate the gain in economy of propulsion resulting from increase in dimensions by means of the following table, which gives particulars of a number of typical cruisers, all of comparatively recent design :—

—	No. 1	No. 2	No. 3	No. 4	No. 5
Length (feet)	280	300	360	435	500
Breadth (feet)	35	43	60	69	71
Mean draught (feet)	13	16½	23½	24½	26½
Displacement (tons)	1,800	3,400	7,400	11,000	14,200
I.H.P. for 20 knots	6,000	9,000	11,000	14,000	15,500
I.H.P. per ton of displacement	3·33	2·65	1·48	1·27	1·09

The figures given are the results of actual trials, and embody therefore the efficiencies of propelling machinery, propellers, and forms of the individual ships. Even so they are instructive. Comparing the first and last, for example, it will be seen that, while the displacement is increased nearly *eightfold*, the power for 20 knots is only increased about 2·6 times. If the same types of engines and boilers had been adopted in these two vessels—which was not the case, of course—the weights of propelling apparatus and coal for a given distance would have been proportional to the respective powers; that is to say, the larger vessel would have been equipped with only 2·6 times the weight carried by the smaller. On the other hand, roughly speaking, the *disposable weights*, after providing for hulls and fittings in these two vessels, might be considered to be proportional to their displacements. As a matter of fact, this assumption is distinctly in favour of the smaller ship. Adopting it, the larger vessel would have about *eight* times the disposable weight of the smaller; while the demand for propelling apparatus and fuel would be only 2·6 times that of the smaller vessel. There would therefore be an enormous margin of carrying power in comparison with displacement in the larger vessel. This might be devoted, and in fact was devoted, partly to the attainment of a speed considerably exceeding 20 knots (which was a maximum for the smaller vessel), partly to increased coal endurance, and partly to protection and armament.

Another interesting comparison may be made between vessels Nos. 4 and 5 in the preceding table, by tracing the growth in power necessary to drive the vessels at speeds ranging from 10 knots up to 22 knots.

		No. 4	No. 5
10 knots	... ..	1,500-H-P	1,800-H.P.
12 "	... ..	2,500 "	3,100 "
14 "	... ..	4,000 "	5,000 "
16 "	... ..	6,000 "	7,500 "
18 "	... ..	9,000 "	11,000 "
20 "	... ..	14,000 "	15,500 "
22 "	... ..	23,000 "	23,000 "

It will be noted that up to the speed of 18 knots there is a fairly constant ratio between the powers required to drive the two ships. As the speeds are increased the larger ship gains, and at 22 knots the same power is required in both ships. The smaller vessel, as a matter of fact, was designed for a maximum speed of $20\frac{1}{2}$ knots, and the larger for 22 knots. Unless other qualities had been sacrificed, neither space nor weight could have been found in the smaller vessel for machinery and coals corresponding to 22 knots. The figures are interesting, however, as illustrations of the principle that economy of propulsion is favoured by increase in dimensions as speeds are raised.

Going a step further, it may be assumed that in unsheathed cruisers of this class about 40 per cent. of the displacement will be required for the hull and fittings, so that the balance or "disposable weight" would be about 60 per cent. ; say 6,600 tons for the smaller vessel, and 8,500 tons for the larger, a gain of nearly 2,000 tons for the latter. If the speed of 22 knots were secured in both ships, with machinery and boilers of the same type, the larger ship would therefore have about 2,000 tons greater weight available for coals, armament, armour, and equipment.

These illustrations of well-known principles have been given simply for the assistance of those not familiar with the subject, and they need not be carried further. More general treatment of the subject, based on experimental and theoretical investigation, will be found in text-books of naval architecture, but would be out of place in this address.

SWIFT TORPEDO-VESSELS.

Torpedo flotillas are comparatively recent additions to war fleets. The first torpedo-boat was built by Mr. Thornycroft for the Norwegian Navy in 1873, and the same gentleman built the first torpedo-boat for the Royal Navy in 1877. The construction of the larger class, known as "torpedo-boat destroyers," dates from 1893. These various classes furnish some of the most notable examples extant of the attainment of extraordinarily high speeds, for short periods and in smooth water, by vessels of small dimensions. Their qualities and performances, therefore, merit examination.

Mr. Thornycroft may justly be considered the pioneer in this class of work. Greatly impressed by the combination of lightness and power embodied in railway locomotives, Mr. Thornycroft applied similar principles to the propulsion of small boats, and obtained remarkably high speeds. His work became more widely known when the results were

published of a series of trials conducted in 1872 by Sir Frederick Bramwell on a small vessel named the "Miranda." She was only 45 feet long and weighed 4 tons, yet she exceeded 16 knots on trial. The Norwegian torpedo-boat built in 1873 was 57 feet long, $7\frac{1}{2}$ tons, and of 15 knots; the first English torpedo-boat of 1877 was 81 feet long, 29 tons, and attained $18\frac{1}{2}$ knots.

Mr. Yarrow also undertook the construction of small swift vessels at a very early date, and has greatly distinguished himself throughout the development of the torpedo flotilla. Messrs. White, of Cowes, previously well known as builders of steam-boats for use on board ships, extended their operations to the construction of torpedo-boats. These three firms for a considerable time practically monopolised this special class of work in this country. Abroad they had able competitors in Normand in France, Schichau in Germany, and Herreshoff in the United States. Keen competition led to successive improvements and rapid rise in speed. During the last six years the demand for a fleet of about 100 destroyers, to be built in the shortest possible time, involved the necessity for increasing the sources of supply. At the invitation of the Admiralty, a considerable number of the leading shipbuilding and engineering firms have undertaken and successfully carried through the construction of destroyers varying from 26 to 33 knots in speed, although the work was necessarily of a novel character, involving many difficulties.

As the speeds of torpedo-vessels have risen, so have their dimensions increased. Within the class the law shown to hold good in larger vessels applies equally. In 1877 a first-class torpedo-boat was 81 feet long, under 30 tons weight, developed 400-H.P., and steamed $18\frac{1}{2}$ knots. Ten years later the corresponding class of boat was 135 feet long, 125 tons weight, developed 1,500-H.P., and steamed 23 knots. In 1897 it had grown to 150 feet in length, 140 to 150 tons, 2,000-H.P., and 26 knots.

Destroyers are not yet of seven years' standing, but they come under the rule. The first examples (1893) were 180 feet long, 240 tons, 4,000-H.P., and 26 to 27 knots. They were followed by 30-knot vessels, 200 to 210 feet long, 280 to 300 tons, 5,500 to 6,000-H.P. Vessels now in construction are to attain 32 to 33 knots, their lengths being about 230 feet, displacements 360 to 380 tons, and engine-power 8,000 to 10,000-H.P.

Cost has gone up with size and power, and the limit of progress in this direction will probably be fixed by financial considerations, rather than by constructive difficulties, great as these become as speeds rise.

It may be interesting to summarise the distinctive features of torpedo-vessel design.

1. The propelling apparatus is excessively light in proportion to the maximum power developed. Water-tube boilers are now universally adopted, and on speed trials they are "forced" to a considerable extent. High steam pressures are used. The engines are run at a high rate of revolution—often at 400 revolutions per minute. Great care is taken in every detail to economise weight. Speed trials at maximum power only extend over three hours. On such trials in a destroyer each ton weight

of propelling apparatus produces about 45-I.H.P. Some idea of the relative lightness of the destroyer's machinery and boilers will be obtained when it is stated that in a large modern cruiser with water-tube boilers, high steam pressure, and quick-running engines, the maximum power obtained on an eight hours' trial corresponds to about 12-I.H.P. per ton of engines, boilers, etc. That is to say, the proportion of power to weight of propelling apparatus is from three and a half to four times as great in the destroyer as it is in the cruiser.

2. A very large percentage of the total weight (or displacement) of a torpedo-vessel is assigned to propelling apparatus. In a destroyer of 30 knots trial-speed, nearly one-half the total weight is devoted to machinery, boilers, etc. In the swiftest cruisers of large size the corresponding allocation of weight is less than 20 per cent. of the displacement, and in the largest and fastest mail steamers it is about 20 to 25 per cent.

3. The torpedo-vessel carries a relatively small load of fuel, equipment, etc. Taking a 30-knot destroyer, for example, the speed trials are made with a load not exceeding 12 to 14 per cent. of the displacement. In a swift cruiser the corresponding load would be from 40 to 45 per cent., or proportionately more than three times as great. What this difference means may be illustrated by two statements. If the load in a destroyer were trebled and the vessel correspondingly increased in draught and weight, the speed attained with the same maximum power would be about 3 knots less. If, on the other hand, the vessel were designed to attain 30 knots on trial with the heavier load, her displacement would probably be increased about 70 to 80 per cent.

4. The hull and fittings of the torpedo-vessel are exceedingly light in relation to the dimensions and engine-power. For many parts of the structure steel of high tensile strength is used. Throughout, the utmost care is taken to economise weight. In small vessels, for special service, many conditions can be accepted which would be inadmissible in larger sea-going vessels. The result of all this care is the production of hull-structures having ample *general* strength for their special service. Lightness of *scantling*, of course, involves small *local* strength against collision, grounding, and other accident. Experience proves, however, that this involves no serious risk or difficulty.

These conditions are essential to the attainment of very high speeds for short periods. They resemble the conditions ruling the design of cross-Channel steamers, so far as relative lightness of propelling apparatus, small load, and light scantlings are concerned. The essential differences lie in the requirements for passenger accommodation as compared with the requirements for armament of the torpedo-vessel. No one has yet proposed to extend the torpedo-vessel system to sea-going ships of large dimensions. Very similar conditions for the propelling apparatus have been accepted in a few cruisers of considerable dimensions, wherein high speeds for short periods were required. It is, however, unquestionable that in many ways, and particularly in regard to

machinery design, the construction of torpedo-vessels has greatly influenced that of larger ships.

One important consideration must not be overlooked. For short-distance steaming at high speeds economy in coal consumption is of little practical importance, and it is all-important to secure lightness of propelling apparatus in relation to power. For long-distance steaming, on the contrary, economy in coal consumption is of primary importance; and savings in weight of propelling apparatus, even of considerable amount, may be undesirable if they involve increased coal consumption. Differences of opinion prevail as to the real economy of fuel obtainable with boilers and engines such as are fitted in torpedo-vessels. Claims are made for some vessels which represent remarkable economy. Only enlarged experience can settle these questions.

Endurance is also an important quality in sea-going ships of large size, not merely in structures, but in propelling apparatus. The extreme lightness essential in torpedo-vessels obviously does not favour endurance if high powers are frequently or continuously required. Still, it cannot be denied that the results obtained in torpedo-vessels show such a wide departure from those usual in sea-going ships as to suggest the possibility of some intermediate type of propelling apparatus applicable to large sea-going ships and securing sufficient durability and economy of fuel in association with further savings of weight.

THE PARSONS TURBO-MOTOR.

The steam turbo-motor introduced by Mr. Charles Parsons is to be described by the inventor during these meetings; but it is impossible for me to pass it over in this review without a brief notice. This rotary engine, with its very high rate of revolution, reduces the weights of machinery, shafting, and propellers greatly below the weight required in the quickest-running engines of the reciprocating type. This reduction in the proportion of weight to power carries with it, of course, the possibility of higher speed in a vessel of given dimensions; and when large powers are employed the absolute gain is very great. An illustration of this has been given by Mr. Parsons in the "Turbinia." That remarkable vessel is 100 feet long and of $44\frac{1}{2}$ tons displacement, but she has attained 33 to 34 knots in short runs. There are three shafts, each carrying three screw propellers, each shaft driven by a steam turbine making over 2,000 revolutions at full speed, when more than 2,000-H.P. is developed. A water-tube boiler of special design supplies steam of 175 lbs. pressure and is exceptionally light for the steam produced, being highly forced. The whole weight of machinery and boilers is 22 tons; in other words, about 100-H.P. (indicated) is produced for each ton weight of propelling apparatus. This is rather more than twice the proportion of power to weight as compared with the lightest machinery and boilers fitted in torpedo-boats and destroyers. It will be noted that in the "Turbinia," as in the destroyers, about half the total weight is devoted to propelling apparatus; and in both instances the load carried is relatively small. The secret of the extraordinary speed is to be found in the extreme lightness of propelling apparatus and small load.

No doubt in the "Turbinia" lightness has been pushed further than it would be in vessels of larger size and greater power. In such vessels a lower rate of revolution would probably be accepted, additional motors would be fitted for manœuvring and going astern, boilers of relatively greater weight would be adopted, and other changes made. But, after making ample allowance for all such increases in weight, it is unquestionable that considerable economies must be possible with rotary engines. Two other vessels of the destroyer type with turbo-motors (one for the Royal Navy) are now approaching completion. Their trials will be of great interest, as they will furnish a direct comparison with vessels of similar size and form, fitted with similar boilers and driven by reciprocating engines.

On the side of coal consumption, Mr. Parsons claims at least equality with the best triple-expansion engines. Into the other advantages attending the use of rotary engines it is not necessary now to enter.

Reference must be made, however, to one matter in which Mr. Parsons has done valuable and original work. In torpedo-vessels of high speed the choice of the most efficient propellers has always been a matter of difficulty, and the solution of the problem has in many instances involved extensive experimental trials. By means of alterations in propellers alone, very large increases in speed have been effected; and even now there are difficulties to be faced. When Mr. Parsons adopted the extraordinary speed of revolution just named for the "Turbinia," he went far beyond all experience and precedent and had to face unknown conditions. He has found the solution, after much patient and original investigation, in the use of multiple screws of small diameter. His results in this direction are of general interest to all who have to deal with screw propulsion.

Such radical changes in propelling machinery as are involved in the adoption of turbo-motors must necessarily be subjected to thorough test before they will be widely adopted. The experiment which the Admiralty are making is not on a small scale as regards power. Although it is made in a destroyer, about 10,000-H.P. will probably be developed and a correspondingly high speed attained. It may well happen that from this experiment very far-reaching effects may follow. Mr. Parsons himself has prepared many designs illustrating various applications of the system to sea-going, cross-Channel, and special-service vessels. Where shallowness of draught is unavoidable, the small diameter of the screws possible with the quick-running turbines is clearly an important matter.

COMPARISONS BETWEEN LARGE AND SMALL VESSELS.

It has been shown that the attainment of very high speeds by vessels of small size involves many conditions not applicable to large sea-going steam-ships. But it is equally true that in many ways the trials of small swift vessels constitute model experiments from which interesting information may be obtained as to what would be involved in driving ships of large size at speeds much exceeding any of which we have experience. When the progressive steam-trials of such small vessels can be studied

side by side with experiments made on models to determine their resistance at various speeds, then the fullest information is obtained and the best guide to progress secured. This advantage, as has been said, we owe to William Froude.

His contributions to the Reports of the British Association are classics in the literature of the resistance and propulsion of ships. In 1874 he practically exhausted the subject of frictional resistance so far as it is known; and his presidential address to this section in 1875 dealt fully and lucidly with the modern or stream-line theory of resistance. No doubt there would be advantage in extending Froude's experiments on frictional resistance to greater lengths and to ship-shaped forms. It is probable also that dynamometric determinations of the resistance experienced by ships of modern forms and considerable size when towed at various speeds would be of value if they could be conducted. These extensions of what Froude accomplished are not easily carried out; and in this country the pressure of work on shipbuilding for the Royal Navy has, for many years past, taxed to the utmost limits the capacity of the Admiralty experimental establishment so ably superintended by Mr. R. E. Froude, allowing little scope for purely scientific investigations, making it difficult to deal with the numerous experiments incidental to the designs of actual ships. Now that Holland, Russia, Italy, and the United States have equipped experimental establishments, while Germany and France are taking steps in that direction, we may hope for extensions of purely scientific work and additions to our knowledge. In this direction, however, I am bound to say that much might be done if experimental establishments capable of dealing with questions of a general nature relating to resistance and propulsion were added to the equipment of some of our universities and colleges. Engineering laboratories have been multiplied, but there is as yet no example of a model experimental tank devoted to instruction and research.

It is impossible, and possibly is unnecessary, to attempt in this address any account of Froude's "scale of comparison" between ships and models at "corresponding speeds." But it may be of interest to give a few illustrations of the working of this method, in the form of a contrast between a destroyer of 300 tons, 212 feet long, capable of steaming 30 knots an hour, and a vessel of similar form enlarged to 765 feet in length and 14,100 tons. The ratio of dimensions is here about 3.61 : 1; the ratio of displacements is 47 : 1; and the ratio of corresponding speeds is 1.9 : 1.

To 12 knots in the small vessel would correspond 22.8 knots in the large vessel; and the resistance experienced by the large vessel at 22.8 knots (neglecting a correction for friction) should be forty-seven times that of the small vessel at 12 knots. By experiment, this resistance for the small vessel was found to be 1.8 tons. Hence, for the large vessel at 22.8 knots the resistance should be 84.6 tons. This would correspond to an "effective horse-power" of over 13,000, or to about 26,000-I.H.P. The frictional correction would reduce this to about 25,000-H.P., or about 1.8-H.P. per ton. Now turning to the destroyer, it is found experi-

mentally that at 22·8 knots she experiences a resistance of about 11 tons, corresponding to an effective H.P. of over 1,700 and an I.H.P. of about 3,000: say 10-H.P. per ton, or nearly five and a half times the power per ton required in the larger vessel. This illustrates the economy of propulsion arising from increased dimensions.

Applying the same process to a speed of 30 knots in the large ship, the corresponding speed in the small ship is 15·8 knots. Her resistance at that speed is experimentally determined to be 3·5 tons, and the resistance of the large ship at 30 knots (neglecting frictional correction) is about 165 tons. The effective H.P. of the large ship at 30 knots is, therefore, about 34,000, corresponding to 68,000-I.H.P. Allowing for the frictional correction, this would drop to about 62,000-H.P., or 4·4-H.P. per ton. For the destroyer at 30 knots the resistance is about 17½ tons; the effective H.P. is 3,600, and the I.H.P. about 6,000, or 20-H.P. per ton, nearly five times as great as the corresponding power for the large ship. But while the destroyer under her trial conditions actually reaches 30 knots, it is certain that in the large ship neither weight nor space could be found for machinery and boilers of the power required for 30 knots, and of the types usually adopted in large cruisers, in association with an adequate supply of fuel. The explanation of the methods by which the high speed is reached in the destroyer has already been given. Her propelling apparatus is about one-fourth as heavy in relation to its maximum power, and her load is only about one-third as great in relation to the displacement, when compared with the corresponding features in a swift modern cruiser.

It will, of course, be understood that in practice, under existing conditions, a cruiser of 14,000 tons would not be made 765 feet long, but probably about 500 feet. The hypothetical cruiser has been introduced simply for purposes of comparison with the destroyer.

The earlier theories of resistance assumed that the resistance experienced by ships varied as the square of the speed. We now know that the frictional resistances of clean-painted surfaces of considerable length vary as the 1·83 power of the speed. This seems a small difference, but it is sensible in its effects, causing a reduction of 32 per cent. at 10 knots, nearly 40 per cent. at 20 knots, and 42 per cent. at 25 knots. On the other hand, it is now known that the laws of variation of the residual or wave-making resistance may depart very widely from the law of the square of the speed, and it may be interesting to trace for the typical destroyer how the resistance actually varies.

Take first the *total resistance*. Up to 11 knots it varies nearly as the square of the speed; at 16 knots it has reached the cube; from 18 to 20 knots it varies as the 3·3 power. Then the index begins to diminish: at 22 knots it is 2·7; at 25 knots it has fallen to the square, and from thence to 30 knots it varies, practically, as does the frictional resistance.

The residual resistance varies as the square of the speed up to 11 knots, as the cube at 12½ to 13 knots, as the fourth power about 14½ knots, and at a higher rate than the fifth power at 18 knots. Then the index begins to fall, reaching the square at 24 knots, and falling still lower at higher speeds.

It will be seen, therefore, that when this small vessel has been driven up to 24 or 25 knots by a large relative expenditure of power, further increments of speed are obtained with less proportionate additions to the power.

Passing from the destroyer to the cruiser of similar form but of 14,100 tons, and once more applying the "scale of comparison," it will be seen that to 25 knots in the destroyer corresponds a speed of $47\frac{1}{2}$ knots in the large vessel. In other words, the cruiser would not reach the condition where further increments of speed are obtained with comparatively moderate additions of power until she exceeded 47 knots, which is an impossible speed for such a vessel under existing conditions. The highest speeds that could be reached by the cruiser with propelling apparatus of the lightest type yet fitted in large sea-going ships would correspond to speeds in the destroyer, for which the resistance is varying as the highest power of the speed. These are suggestive facts.

Frictional resistance, as is well known, is a most important matter in all classes of ships and at all speeds. Even in the typical destroyer this is so. At 12 knots the friction with clean-painted bottom represents 80 per cent. of the total resistance; at 16 knots 70 per cent.; at 20 knots a little less than 50 per cent.; and at 30 knots 45 per cent. If the co-efficient of friction were doubled and the maximum power developed with equal efficiency, a loss of speed of fully 4 knots would result.

In the cruiser of similar form the friction represents 90 per cent. at 12 knots, 85 per cent. at 16 knots, nearly 80 per cent. at 20 knots, and over 70 per cent. at 23 knots. If the co-efficient of friction were doubled at 23 knots and the corresponding power developed with equal efficiency, the loss of speed would approximate to 4 knots.

These illustrations only confirm general experience that clean bottoms are essential to economical propulsion and the maintenance of speed, and that frequent docking is necessary in vessels with bare iron or steel skins, which foul in a comparatively short time.

POSSIBILITIES OF FURTHER INCREASE IN SPEED.

From the facts above mentioned, it is obvious that the increase in speed which has been effected is the result of many improvements, and has been accompanied by large additions to size, engine-power, and cost. These facts do not discourage the "inventor," who finds a favourite field of operation in schemes for attaining speeds of 50 to 60 knots at sea in vessels of moderate size. Sometimes the key to this remarkable advance is found in devices for reducing surface-friction by the use of wonderful lubricants to be applied to the wetted surfaces of ships, or by interposing a layer of air between the skins of ships and the surrounding water, or other departures from ordinary practice. If these gentlemen would "con- descend to figures," their estimates, or guesses, would be less sanguine. In many cases the proposals made would fail to produce any sensible reduction in resistance; in others they would increase resistance.

Other proposals rest upon the idea that resistance may be largely reduced by adopting novel forms, departing widely from ordinary ship shapes. Very often small-scale experiments, made in an unscientific and inaccurate manner, are adduced as proofs of the advantages claimed. In other instances mere assertion is thought sufficient. Ordinarily no regard is had to other considerations, such as internal capacity, structural weight and strength, stability and seaworthiness. Most of these proposals do not merit serious consideration. Any which seem worth investigation can be dealt with simply and effectively by the method of model experiments. A striking example of this method will be found in the unusual form of a Parliamentary Paper (No. 313, of 1873), containing a report made by Mr. William Froude to the Admiralty. Those interested in the subject will find therein much matter of special interest in connection with the conditions attending abnormally high speeds. It must suffice now to say that ship-shaped forms are not likely to be superseded at present.

The most prolific "inventions" are those connected with supposed improvements in propellers. One constantly meets with schemes guaranteed by the proposers to give largely increased efficiency and corresponding additions to speed. Variations in the numbers and forms of screws or paddles, the use of jets of water or air expelled by special apparatus through suitable openings, the employment of explosives, imitations of the fins of fishes and numberless other departures from established practice are constantly being proposed. As a rule the "inventors" have no intimate knowledge of the subject they treat, which is confessedly one of great difficulty. When experiments are adduced in support of proposals they are almost always found to be inconclusive and inaccurate. More or less mathematical demonstrations find favour with other inventors, but they are not more satisfactory than the experiments. An air of great precision commonly pervades the statements made as to possible increase in efficiency or speed. I have known cases where probable speeds with novel propellers have been estimated (or guessed) to the third place of decimals. In one such instance a trial was made with the new propeller, with the result that instead of a gain in efficiency there was a serious loss of speed. Very few of the proposals made have merit enough to be subjected to trial. None of them can possibly give the benefits claimed.

It need hardly be added that in speaking thus of so-called "inventors" there is no suggestion that improvement has reached its limit, or that further discovery is not to be made. On the contrary, in regard to the forms of ships and propellers, continuous investigation is proceeding and successive advances are being made. From the nature of the case, however, the difficulties to be surmounted increase as speeds rise; and a thorough mastery of the past history and present condition of the problems of steam-ship design and propulsion is required as a preparation for fruitful work in the nature of further advance.

It would be idle to attempt any prediction as to the characteristic features of ocean navigation sixty years hence. Radical changes may well be made within that period. Confining attention to the immediate future,

it seems probable that the lines of advance which I have endeavoured to indicate will remain in use. Further reductions may be anticipated in the weight of propelling apparatus and fuel in proportion to the power developed; further savings in the weight of the hulls, arising from the use of stronger materials and improved structural arrangements; improvements in form; and enlargement in dimensions. If greater draughts of water can be made possible, so much the better for carrying power and speed. For merchant-vessels commercial considerations must govern the final decision; for war-ships the needs of naval warfare will prevail. It is certain that scientific methods of procedure and the use of model experiments on ships and propellers will become of increased importance.

Already avenues for further progress are being opened. For example, the use of water-tube boilers in recent cruisers and battle-ships of the Royal Navy has resulted in saving *one-third* of the weight necessary with cylindrical boilers of the ordinary type to obtain the same power, with natural draught in the stokeholds. Differences of opinion prevail, no doubt, as to the policy of adopting particular types of water-tube boilers; but the weight of opinion is distinctly in favour of some type of water-tube boiler in association with the high steam pressures now in use. Greater safety, quicker steam-raising and other advantages, as well as economy of weight, can thus be secured. Some types of water-tube boilers would give greater saving in weight than the particular type used in the foregoing comparison with cylindrical boilers.

Differences of opinion prevail also as to the upper limit of steam-pressure which can with advantage be used, taking into account all the conditions in both engines and boilers. From the nature of the case, increases in pressure beyond the 160 to 180 lbs. per square inch commonly reached with cylindrical boilers cannot have anything like the same effect upon economy of fuel as the corresponding increases have had, starting from a lower pressure. Some authorities do not favour any excess above 250 lbs. per square inch on the boilers; others would go as high as 300 lbs., and some still higher.

Passing to the engine-rooms, the use of higher steam-pressures and greater rates of revolution may, and probably will, produce reductions in weight compared with power. The use of stronger materials, improved designs, better balance of the moving parts, and close attention to details have tended in the same direction without sacrifice of strength. Necessarily there must be a sufficient margin to secure both strength and endurance in the motive power of steam-ships. Existing arrangements are the outgrowth of large experience, and new departures must be carefully scrutinised.

The use of rotary engines, of which Mr. Parsons' turbo-motor is the leading example at present, gives the prospect of further economies of weight. Mr. Parsons is disposed to think that he could about halve the weights now required for the engines, shafting, and propellers of an Atlantic liner while securing proper strength and durability. If this could be done in association with the use of water-tube boilers it would effect a

revolution in the design of this class of vessel, permitting higher speeds to be reached without exceeding the dimensions of existing ships.

It does not appear probable that, with coal as the fuel, water-tube boilers will surpass in economy the cylindrical boilers now in use; and skilled stoking seems essential if water-tube boilers are to be equal to the other type in rate of coal consumption. The general principle holds good that as more perfect mechanical appliances are introduced, so more skilled and disciplined management is required in order that the full benefits may be obtained. In all steam-ship performance the "human factor" is of great importance, but its importance increases as the appliances become more complex. In engine-rooms the fact has been recognised and the want met. There is no reason why it should not be similarly dealt with in the boiler-rooms.

Liquid fuel is already substituted for coal in many steam-ships. When sufficient quantities can be obtained it has many obvious advantages over coal, reducing greatly manual labour in embarking supplies, conveying it to the boilers and using it as fuel. Possibly its advocates have claimed for it greater economical advantages over coal than can be supported by the results of extended experiment. Even if the saving in weight for equal evaporation is put as low as 30 per cent. of the corresponding weight of coal, it would amount to a 1,000 tons on a first-class Atlantic liner. This saving might be utilised in greater power and higher speed, or in increased load. There would be a substantial saving on the stokehold staff. At present it does not appear that adequate supplies of liquid fuel are available. Competent authorities here and abroad are giving attention to this question, and to the development of supplies. If the want can be met at prices justifying the use of liquid fuel, there will undoubtedly be a movement in that direction.

Stronger materials for the construction of hulls are already available. They are, however, as yet but little used, except for special classes of vessels. Mild steel has taken the place of iron, and effected considerable savings of weight. Alloys of steel with nickel and other metals are now made which give strength and rigidity much superior to mild steel, in association with ample ductility. For destroyers and torpedo-boats this stronger material is now largely used. It has also been adopted for certain important parts of the structures of recent ships in the Royal Navy. Of course, the stronger material is more costly, but its use enables sensible economies of weight to be made. It has been estimated, for example, that in an Atlantic liner of 20 knots average speed about 1,000 tons could be saved by using nickel steel instead of mild steel. This saving would suffice to raise the average speed more than a knot, without varying the dimensions of the ship.

Alloys of aluminium have also been used for the hulls or portions of the hulls of yachts, torpedo-boats, and small vessels. Considerable savings in weight have thus been effected. On the other hand, these alloys have been seriously corroded when exposed to the action of seawater, and on that account are not likely to be extensively used. Other alloys will probably be found which will be free from this defect, and yet unite lightness with strength to a remarkable degree.

Other examples might be given of the fact that the metallurgist has by no means exhausted his resources, and that the shipbuilder may look to him for continued help in the struggle to reduce the weights of floating structures.

It is unnecessary to amplify what has already been said as to possible increase in the efficiency and types of propellers. With limited draught, as speeds increase and greater powers have to be utilised, multiple propellers will probably come into use. Mr. Parsons has shown how such problems may be dealt with; and other investigators have done valuable work in the same direction.

In view of what has happened and is still happening, it is practically certain that the dimensions of steam-ships have not yet attained a maximum.

Thanks to mechanical appliances, the largest ships built, or to be built, can be readily steered and worked. In this particular difficulties have diminished in recent years, notwithstanding the great growth in dimensions.

Increase in length and weight favour the better maintenance of speed at sea. The tendency, therefore, will be to even greater regularity of service than at present. Quicker passages will to some extent diminish risks, and the chance of breakdown will be lessened if multiple propellers are used. Even now, with twin screws, the risk of total breakdown is extremely small.

Whatever may be the size and power of steam-ships, there must come times at sea when they must slow down and wait for better weather. But the larger and longer the vessel, the fewer will be the occasions when this precaution need be exercised.

It must never be forgotten that as ships grow in size, speed, and cost, so the responsibilities of those in charge increase. The captain of a modern steam-ship needs remarkable qualities to perform his multifarious duties efficiently. The chief engineer must have great powers of organisation, as well as good technical knowledge, to control and utilise most advantageously the men and machinery in his charge. Apart from the ceaseless care, watchfulness and skill of officers and men, the finest ships and most perfect machinery are of little avail. The "human factor" is often forgotten, but is all-important. Let us hope that in the future, as in the past, as responsibilities increase so will the men be found to bear them.

TO INDIA:
MILITARY, STATISTICAL, AND STRATEGICAL
SKETCH.—PLAN OF FUTURE CAMPAIGN.

Translated from the Russian of B. T. LEBEDEV,

By Lieutenant H. C. HOLMAN, 16th Bengal Cavalry.

[Continued from page 1329 of the JOURNAL for December, 1899.]

“The more powerful Russia becomes in Central Asia, the weaker does England become in India, and, consequently the more amenable in Europe.”—*A. Sobolev.*

CHAPTER VIII.

IS IT POSSIBLE FOR THE ENGLISH TO ADVANCE TO HERAT WITH THE
OBJECT OF PREVENTING THE CAPTURE OF THAT TOWN BY THE
RUSSIANS?

Let us clear up the question: Will England be reconciled to the seizure by us of Herat; or will she oppose it? What will she do in the latter case? The well-known English military authority, MacGregor, says:—“If the Russians become masters of Herat, it will be extremely difficult, if not impossible, for us to drive them thence. In case of a general war, we might inflict a defeat on Russia in Europe, or on the sea, and compel her to evacuate Herat by treaty. This is quite feasible. But should it be impossible to obtain our demand for the evacuation of Herat, it would be very risky to support them by troops sent into Afghanistan from India.” As a matter of fact, an advance by the English to Herat, with the object of wresting that place from the Russians, would be a most hazardous undertaking, for, in case of a serious reverse, scarcely a small fraction of the English army would ever return. Let us consider a little more closely the situation in which an English army would find itself on reaching Herat. We will start with the strength of the forces which the Indian Government could move to Herat. We have already said that the maximum English field army would number one hundred and forty thousand men.

To safeguard the northern frontier against the mobilised troops of the Turkestan military district, an army of at least fifty thousand men would be required. These would be distributed, approximately, as follows:—

Twenty to twenty-five thousand men towards the composition of the Anglo-Afghan corps, destined to protect the approaches to Kabul from the north.

Twenty thousand men to protect the line of operations, to neglect which would be risky, for, in spite of the probable alliance between the English and the Ameer, the people of Afghanistan would receive the former as their natural enemies. A proof of this is to be found in the events of 1897, when, notwithstanding the peaceful intentions and prohibitions of the Ameer, the tribes north and south of the line Kabul-Peshawar raised the standard of revolt.

Five to ten thousand men to occupy the mountainous region south of the Hindoo-Koosh, *e.g.*, Chitral, Mastuj, and Gilgit, with a view to preventing a rising, and securing the rear.

This is the minimum force which could be left on the northern frontier, for the Afghan troops in Kabul would not number more than twenty-five thousand men after providing for the garrisons of Herat, Kandahar, and other places.

Thus, there remains a force of not more than ninety thousand Anglo-Indian troops for the operations on the line Kandahar-Herat.

Forty thousand men or more would be required to safeguard the line of operations—seven hundred and twenty-six miles long—from the Indus to Herat.

In his work "The Defence of India," MacGregor mentions the number of troops necessary to safeguard the line Pishin-Herat, and Jamrud-Kabul. He considers twenty thousand men, with twenty-four guns, sufficient for the first line; and thirteen thousand men, with thirty guns, for the second line. An equal number of men should be added to the first estimate to guard the rear as far as the Indus, or even to Karachi, and the second estimate falls short of the actual requirements, owing to the hostility of the frontier tribes.

Thus, no more than fifty thousand men could be sent against Herat, and even these would not be of the most satisfactory quality, because of the presence of unreliable auxiliaries. To use the latter to guard the rear of the Herat army would be risky, because, in the event of a reverse, the line of communications of the said army would be liable to attack by its guard. It would be no less hazardous to detail a large number of these troops for the northern army, in which the proportion of English troops would be comparatively small, for they might, by coming to an understanding with the turbulent frontier tribes, make the position of the English on the north hopeless.

Having indicated the strength and quality of the British force which could be sent to Herat, we will see whether it could reach that place before the arrival of considerable Russian forces, and whether it could anticipate the capture of the town.

Let us first consider how soon the English could receive news of our mobilisation, and of the advance of the Russian troops to Herat, and also with what speed the Anglo-Indian army could mobilise.

To begin with, we will investigate the means at the disposal of the English within the limits of the Trans-Caspian district. At the present time, they have four consulates, at distances of sixty-six to ninety-nine miles from our frontier, *i.e.*, at Tabriz, Resht, Astrabad, and Meshed.

In addition to these there are, it appears, diplomatic agencies in Herat and Mazar-i-Sherif. The consulates have correspondents in Kuchan, Mametabad, Sarakhs, Herat, Turbet-Sheikh-Djam, Rui und Birdjan.

All the consulates are connected by telegraph with each other, their principal agents, and the European telegraph system. The line between Meshed and Teheran was constructed with English capital, and is under English supervision. The Meshed consulate communicates with its Khaf and Herat agencies by flying post, and with its Bridjan agency by Persian post.

In addition to the above arrangements for the collection of information, the English have secret correspondents among the natives within our borders, and periodically send special scouts as well.

The Afghan agency also assists the English agents. It is evident, therefore, that the English have organised an excellent system of intelligence, and that, consequently, it would be almost impossible to carry out a secret mobilisation of our troops in the Trans-Caspian district. Any event out of the common is immediately reported in Meshed, whence it is made known in Calcutta and London within twenty-four hours.

The example which we have already quoted, the mobilisation of the Bajaur division in eighteen days, does not speak well for the rapidity of mobilisation of the Anglo-Indian army.

The transportation of troops to the frontier at Chaman would take a long time. According to David Ross, an authority on railway matters, twelve trains could be run daily from Lahore to Quetta or Chaman. These would carry 2,160 men of all arms, with their followers, horses, and guns. Given these *data*, we can make a rough calculation of the time required for the transportation of the fifty thousand men of the Herat field force, and of the fifteen thousand men who would be told off to guard the line of communications Quetta-Herat. Dividing the 65,000 by 2,160, and adding the time required for the actual journey, say three days on an average, we get thirty-three as the number of days which would be required for the transportation of the troops to the frontier at Chaman.

A German, well acquainted with the literature of the subject we are discussing, who spent eight months in India, confirms our opinion regarding the slowness of mobilisation and movement of Anglo-Indian troops. Thus he says²:—"Their railways have no double lines, and, moreover, different railways have different gauges; the amount of rolling-stock is insufficient, and the necessary knowledge regarding the entraining and detraining of troops and transport is lacking. All these circumstances would certainly militate most seriously against rapidity in the transportation of troops."

¹ To this number should be added the garrison of Quetta, five thousand to seven thousand men.

² "A German View of the Defence of India." Translated from the German by Captain E. S. May, R.A., in the *United Service Magazine*, March, 1891.

Thus, a month from the first day of entraining, or six weeks or more from the first day of mobilisation, the fifty-thousand-strong field force could be moved to Kandahar.¹ If to this we add the time that would elapse before the British Government received news of the mobilisation or advance of our troops, and the time for it to decide upon opposing the capture of Herat by advancing on that place, as also for the preparation of an Anglo-Indian army for the campaign from Kandahar, we arrive at an estimate of not less than two months. This period may possibly be reduced, because the English could carry on the entraining of the troops and the organisation of the transport simultaneously, and provide the troops with their transport as they arrived at Quetta or Chaman; but it could not be reduced to any very considerable extent, because the transport required for a month's supplies for an army of fifty thousand men would involve the collection of an enormous number of animals. It should be remembered that two thousand camels were required for Turner's brigade at the commencement of the Waziri Expedition. These were collected in two months.

Thus, although we have no accurate details relating to the mobilisation of the Anglo-Indian Army, we have pointed out its slowness, and can, therefore, say with confidence that the time required to get the said army into a state of readiness for an advance would considerably exceed that necessary for our troops.

Without quoting figures in proof of what we have just said about our own forces, we may mention that we should not require to organise such a formidable amount of transport for the advance of our troops to Herat as would be necessary to take the English army to the same place. Moreover, the line of operations of our troops would lead through our territory, where we could make our own arrangements for supplies.

To simplify our deductions, let us assume that the mobilisation of our army and that of the English army would be completed simultaneously. Then, twenty-three to twenty-five days after mobilisation, our troops, to the number of twenty-two thousand men, with forty-eight guns, would arrive at Herat. The reserves would be placed as follows:—

At Dooshak, 283 miles from Herat, seventeen thousand men and thirty-two guns; at Sarakhs and Pool-i-Khotum, 204, and 165 miles from Herat, eleven thousand men and twenty-two guns.

By this time the fifty-thousand-strong English army would start from Kandahar² for Herat, 363 miles distant. Consequently, on arrival at Herat, the English would find fifty thousand Russians with one hundred and two guns. Herat would, in all probability, be taken by our troops, for they would have five weeks at their disposal for the reduction of the place, pending the arrival of the Anglo-Indian army.

¹ The fifty thousand men would be conveyed to the frontier in about twenty-three days; thence they would march to Kandahar in six days.

² We are assuming that, owing to hurried preparations for the campaign, the English army could leave Kandahar within a month of the completion of mobilisation.

According to the statistics of 1893¹ the garrison of Herat consists of: six thousand Afghan infantry; twelve thousand Afghan artillery; seventy-two Afghan guns.

The town was fortified under the supervision of English engineers. The artillery consists principally of:—

Six eight-pounder smooth-bore guns	} presented by the British Government.
Ten eight-inch howitzers	
Twelve twenty-four-pounder howitzers	
Fourteen thousand rounds	

We may be sure that from four to five weeks would be quite sufficient to enable our troops to hoist the Russian flag on the walls of Herat.²

Thus, the Anglo-Indian army of fifty thousand men would find, on arrival at Herat, that the place was occupied by the Russians, and that the latter had a picked army of fifty thousand men under its walls.

The position of the English might then become hopeless, if we sent a portion of our forces *via* Khaf and the Khaf Desert to turn Herat in the direction of Sebzevar and Farra.

The latest reconnaissance has proved that the Khaf Desert, in spite of the forbidding appearance given to it on existing maps, is quite passable in all directions, the only obstacles being the Lake of Nemeksar, and an inconsiderable strip of sand. In 1870, the army of Mohamed-Yakub-Khan crossed this desert without transport or supplies, and at a time when there was a fearful famine in the land.

It is clear, therefore, that all the chances of failure are on the side of the English. Their army, if beaten, would have to retire through a wasted country, whilst continually exposed to attacks in flank.

Should the English decide upon the concentration of almost the whole of their forces on the southern line of operations, by entrusting the defence of the approaches to Kabul to the Afghans, the troops of the Turkestan military district would receive orders to advance to Herat.³ In this case we should have the advantage of position over the English, whose defeat might lead to the destruction of their field army, the consequence of which would be a rising in India, and the annihilation of the army guarding the interior.

We may now be reminded of the reserves, in the shape of two army corps, which may arrive from England. Our answer to this is that we could mobilise two corps in the same time, backed up by the remaining Russian corps, which are closer to our objective than the English reserves.

¹ "Invasion of India by the Russians." Article by Younghusband in the May number of the *Nineteenth Century*, 1893.

² It would be useful to strengthen the artillery of the field force by a howitzer battery from the Caucasian military district.

³ It would be more correct to direct the troops of the Turkestan military district on Herat than on Kabul, so as to take full advantage of the unfavourable situation of the one-hundred-thousand-strong English army, separated from its frontier by 396 miles. Moreover, all our energies should be devoted to the attainment of the main object of the campaign—the capture, and retention by us, of Herat.

Thus, it is scarcely likely that England would decide to take Herat from us by force. She would probably declare war against Russia, and strive to inflict damage on us by sea, with the object of compelling us to evacuate Herat, or she may have recourse to her unceasing intrigues and, selecting a convenient opportunity, bring about complications in Europe, and then declare war. Russia should reply, in any case, by an advance of her troops to Kandahar and Kabul. Such an advance would not present great difficulties, for, thanks to the occupation of Herat and the organisation of a base, all the difficulties connected with distance and means of communication would be set aside, and the hard question of supply simplified.

In conclusion of this chapter, we will quote the words of General Sobolev in his work "The Anglo-Afghan Conflict":—"We undertake to doubt the ability of the English to assume the offensive from India. Neither the internal situation nor the organisation of the Anglo-Indian Army is compatible with the policy of advance. We are deeply convinced of the truth of this statement, which is clearly demonstrated by the campaign we have studied. The English waged war with a portion of the Afghan people, who had, at that time, neither a properly constituted Government nor a Regular Army; and yet they suffered reverse after reverse, which brought all their proud demands from the people to naught. A large English army, led into Afghanistan and commanded by trained officers, amongst whom were many talented generals, was not able to conquer a portion of a weak neighbouring kingdom which was, moreover, in a state of anarchy."

The opinion of General Sobolev finds fresh confirmation in the events of 1897—an unsuccessful campaign of the English against the revolted tribes on the North-Western scientific frontier.

CHAPTER IX.

ENGLISH VIEWS REGARDING THE DEFENCE OF THE NORTH-WESTERN INDIAN FRONTIER.

Before working out the plan for the advance of our armies to the Indus, let us review the opinions of English authorities about the nature of the defence of India.

There are two opinions regarding the defence of the Indian frontier: one school of authorities, for instance, Lord Lawrence, Lord Napier of Magdala, Sir William Mansfield, General (now Lord) Roberts, and Lord Chelmsford, maintain that it is better to defend one's own frontier than to carry on a struggle in such a difficult and hostile country as Afghanistan, far from reserves and other resources; the other school, with MacGregor at the head of it, pin their faith to an offensive-defensive, coupled with the occupation of advanced posts in Afghanistan and the Hindoo Koosh. The arguments advanced by the first school are, generally speaking, as follows: the North-Western Frontier forms a strong defensive line, whilst the *terrain* about Kandahar and Kabul is extremely weak as regards defensive positions.

The defensibility of the North-Western Frontier does not only depend upon the River Indus—a serious obstacle—and upon the garrisons of Quetta and Peshawar, but also upon the nature of the country between the Indus and the line Kabul-Ghazni-Kandahar.

On advancing, the English army would find itself in front of the most difficult defiles, which would, in case of a reverse, facilitate its utter defeat, and, even if all went well, present such tremendous difficulties as regards communications as to greatly increase the cost of the campaign.

On the other hand, the Russian troops, on approaching the Indus, will be so far from their base as to render the safeguarding of the long line of communications far from easy. Moreover, after exhausting marches, entailing the surmounting of obstacles in the above-mentioned localities, the Russians will come under the fire of forts, and be attacked by English forces, confident of success.

General Roberts says:—"The longer and more difficult her line of communications, the more numerous and difficult will be the obstacles Russia will have to overcome. So as not to shorten her route by a single mile, I would leave the chain of obstacles to her, exactly as they stand, right away to the very mouth of the Khyber."¹ He further says that the first necessity is to have a sufficiently large army, and the next to extend the system of communications, so as to facilitate the concentration of troops along the frontier; the advocates of a frontier defence further urge that such would not entail the organisation of great transport trains—an absolute necessity in the case of offensive action—and thus, in addition to a great saving in money, India would be spared from that exhaustion of her transport resources which crippled her internal trade after the Afghan war.

Earl Grey writes:—"By organising means for the rapid movement of superior forces to any point on the frontier where an attack might be expected, we should have a thorough guarantee for the discomfiture of the hostile troops operating against us. If the money spent on useless wars were only used for the laying of railways along our frontiers and the construction of two or three fortified localities where troops could be collected in readiness to attack the enemy as soon as he appeared on our frontier, we should be ensured against all attacks on our possessions, whether by Russian troops themselves, or by Asiatics acting with the assistance and under the guidance of the Russians."²

The views of Lord Chelmsford on the defence of the North-Western frontier are also interesting.³ He considers it necessary to conduct the same on the frontier itself, and to meet the enemy when he debouches from the mountains. He brings forward the following arguments in support of his contention:—"The Northern Frontier possesses, so he thinks, strong natural defensive positions, which, when further strengthened by

¹ Lord Roberts, it appears, has now changed his mind.—AUTHOR.

² *The Imperial and Asiatic Quarterly Review, and Oriental and Colonial Record*, July, 1893.

³ *Idem*.

engineers, would make the invasion of India almost a matter of impossibility. The approaches to the Indus, which he considers quite impassable, are covered, on the south, by difficult *terrain*, and by the fortifications of Quetta and Peshawar. In Chelmsford's opinion, the entrenched camp of Quetta not only directly blocks the main routes from Kandahar into India, *via* the Bolan Pass, and to Karachi *via* Kelat and Sonmiani, but also, thanks to its position on the flank of the other routes, guards the River Indus between Sukkur and Dera-Ismail-Khan.

He further says that the portion of the Indus between Attock and Kalabagh may be considered impracticable for a crossing, and that therefore it only remains to guard the river between Kalabagh and Dera-Ismail-Khan.

Chelmsford considers an advance by the Russians on this section of the river from Kandahar unlikely, because such an enterprise would be prevented by a sufficiently large garrison in Quetta, on the flank of their line of advance. He then points to the routes from Ghazni as the only ones open to the Russians for their advance to the section Kalabagh—Dera-Ismail-Khan. These routes lead from Ghazni along the valleys of the Kuram, Tochi, and Gomul. Leaving out of consideration the first, as longer and less practicable than the two latter, Lord Chelmsford points out their difficulties, and the improbability of their being turned to good account, should an army of forty or fifty thousand men advance by them. He nevertheless advocates the safeguarding of the said section of the river by the construction of a fortified camp on the plan of Quetta, without a garrison. Thanks to the extension of the railway along the left bank of the Indus, this section of the frontier could be fortified in a very short time.

Further, with reference to the defence of the Peshawar Valley from the direction of Kabul, Lord Chelmsford quotes the opinion of the authority on strategy, Hamley, who denounces the idea of defending India in advance of the Khyber. "I submit," says Hamley, "that much can be said against, and nothing for, the occupation of a position in advance of the Khyber, which would be a source of weakness, not of strength."

Hamley proposes to close the mouth of the Khyber Pass by a fortified camp, furnished with powerful artillery, and provided with a garrison from Peshawar. In these circumstances he considers that the enemy could not debouch from the Khyber Pass.

With regard to the defence of the Northern Frontier, Lord Chelmsford also advocates meeting the Russians when they debouch from the mountains; he does not recommend the occupation of advanced positions in Chitral and Gilgit, and the construction of military roads to those places, which might facilitate the enemy's advance. He would trust to the country to stop the latter.

After pointing out the advantages of a defence on the frontier itself, Lord Chelmsford proposes to locate the main body of the army on the left bank of the Indus, approximately on the line Lahore-Jhelum-Rawal Pindi; and to place the whole army under the direction of the commander-in-chief, who, remaining with the main body, could, by aid of the telegraph,

direct the operations of the advanced troops, and combine the action of all his forces. All this would give the English the advantages of working on interior lines.

In conclusion, Lord Chelmsford says that it is absolutely necessary to accustom the peoples of India to the idea of this plan of defence of the Government of India, so that they should not think that it is fear which compels the English to await the adversary, instead of going out to meet him. Now that we have acquainted the reader with the nature of the defence of the North-Western Frontier, as advocated by Lord Chelmsford, we will bring forward some extracts from works bearing on the same subject.

In his book "Forty-One Years in India" Lord Roberts asserts that the River Indus is the natural frontier between the spheres of English and Russian influence. Further, a colonel² of the Indian Army lays down the following plan for the defence of India in his book entitled "Backwards or Forwards," which produced a considerable impression:—"To retire to the Indus and completely renounce, even in time of peace, the whole of Baluchistan, from the Persian frontier to Karachi and Jallalabad, and, in case of war, to give up the defence of Peshawar, Dera Ismail Khan, Dera Ghazi Khan, the Ruk Junction and railway, including Karachi. The Russians, on reaching the Indus, are not to be able to cross that great river." After subjecting the Anglo-Indian Army to severe criticism, the author asserts that the native troops are not to be relied upon, and that they would go against England on exposure to danger. He insists that English policy in India should be one of peace.

Now let us consider the arguments of those who advocate the defence of British India on Afghan territory. With reference to a defence in rear of the Suleimans, on the line Peshawar-Bannu-Dera Ismail Khan-Jacobabad or Sukkur, they say that, should such a line of defence be taken up, Russia would, after taking Afghanistan and establishing herself there, construct railways to the foot of the Hindoo Koosh and to the River Helmund, and then open up roads across the mountains, thus gradually overcoming not only the topographical difficulties of the country but also all difficulties connected with the concentration and provisioning of troops. Moreover, the length of the said line would greatly enhance the difficulty of the defence. All the passes would fall into the hands of the Russians, who, though hidden from view of the defenders, would themselves see and know everything, and, screened by the mountains, carry on their preparations for a further advance without molestation. Thus the defenders will have all the disadvantages of want of information and of working in the dark, owing to ignorance of the point of attack selected by the enemy, and of divided forces. All the advantages of initiative, concentration, and freedom of manœuvre will remain with the attacker. Coming to the second possible plan of defence—the defence of a line in rear of the Suleimans, but with one

²Colonel H. B. Hanna.

flank advanced to the Khodja-Amran Range—they considered it just as advantageous as the first, for the following reasons:—

a. The erection and defence of fortifications at Peshawar, Bannu, Dera Ismail Khan, Sukkur, and Quetta, closing the approaches from the mountains in front, and covering the crossings in rear, would lead to a passive, cordon system of defence. Such a system would result in the troops being scattered, tied to different points, and forced into inactivity and weakness, depriving the defence at the very outset of all energy and spirit.

b. The situation of the English troops in the Pishin position would become risky as soon as the Russians occupied the greater portion of Northern Afghanistan, for they could be surrounded, and the enemy could easily cut their communications in rear. The result would be that the Pishin force would either have to retire rapidly, or confine itself to a purely passive defence, in which case, of course, no active operations could be carried out from the Pishin position. The advocates of this advanced position say that it could be protected from a turning movement by a counter-attack from Peshawar, Bannu, and so forth; but the desired result could hardly be obtained, because by deciding to defend the mountain chain on incorrect strategical and tactical principles, the British troops could not in time prevent the Russians from occupying the passes leading to Kabul and Ghazni, and could not, therefore, gain the heights and ridges covering the Pishin position on the north. It would thus be turned, or have to be evacuated. The opponents of this plan further point out that the Pishin position forms a salient angle, pushed out far in advance of the front line of defence, and that it would consequently be the most natural and most vulnerable objective for the attack. Its military existence depends entirely upon the occupation by the defence of the whole of the mountainous portion of Afghanistan north of Pishin.

Besides this, the above-mentioned system of defence would have serious political disadvantages for England. A powerful and most disastrous effect would be produced on the natives in the event of the English awaiting their approaching foes till they had entered Indian territory, and then hazarding the decision of the whole campaign on the vicissitudes of a single battle. Such a scheme of defence would, moreover, deliver Afghanistan straight away into the hands of the Russians, stir up the Afghans against the English, for the former are always ready to go over to the strongest, and render possible a combined insurrection of the numerous warlike tribes on the frontiers of India. The plan of defence behind the River Indus is judged by far the worst of all. To select the Indus as a defensive line would mean relinquishing Afghanistan to Russia, and having a great Power as a neighbour, instead of a weak one.

Thus, the opponents of the indicated plans of defence consider it necessary for the protection of India to make a move westwards into Afghanistan.

The best known scheme of defence by means of advanced posts is that of MacGregor.¹ He was most persistent in urging the Government to occupy Herat and the northern districts, south of the Hindoo Koosh.

¹ Put forward by him in 1884.

We have already seen that, according to the general's proposals, Khorasan and the country of the Cezarehs would be the zones of operations for the detached divisions; that, on the Russians advancing towards Kabul and Kandahar, the defence would be conducted in advance of those places, and that, finally, all this would imply the possession by the English of a field army of 120,000 men. An advocate of the same kind of plan is to be found in Colonel Mark Lever Bell, who says, in his "Defence of India":—"Afghanistan fills, with reference to India, the place of an advanced fortification. We may even compare the occupation by Russians of Afghanistan with the capture of the glacis of a besieged fortress, and at the same time of the most vulnerable bastion. We will compare the seizure by them of the Suleiman passes to the arming by the enemy of masked breaching batteries, threatening the walls of the main rampart. The fall of the fortress then becomes merely a matter of time."

The main points of his plan are the occupation by the main forces of positions at Kandahar, Ghazni, and Kabul, with advanced posts in the Kindoo Koosh and its off-shoots, and readiness to advance beyond the Helmund into Seistan, Herat, Afghan, Turkestan.

Colonel Bell considers the Afghan territory excellently well adapted for offensive-defensive strategical purposes. Its right flank and centre, covered on the north and west by more or less impracticable mountains, would be the zone of defensive operations, whilst the more open and level left flank, bounded on the north, approximately, by the line Kandahar-Vashir-Herat, and on the south by the line Quetta-Nushki-Seistan, would seem admirably adapted to energetic offensive operations.

Bell considers Nushi-Seistan to be the most advantageous line of operations on the west, because an advance by it would compel the Russians to move *via* Khorasan on Meshed, Birdjan, and Lash—a most wearisome and lengthy route.

Colonel Bell bases his plan for the active defence of India on the early laying out on Afghan territory of a complete network of railways and roads fit for wheeled traffic; on the spread of Great Britain's civilising influence among the Afghan peoples; and, lastly, on the consolidation of British power in Afghanistan.

We must not forget to mention Captain C. M. Maguire as one of the advocates of a bold advance as the best means for defending India. His essay on the subject gained the Gold Medal of the United Service Institution of India in 1890.

Thus, we have become acquainted with the views of the two different schools. They have been put forward by men thoroughly acquainted with the future theatre of war; it is, therefore, most difficult to judge as to the correctness of their contentions. In our opinion, each system of defence has its advantages and disadvantages, and it is impossible to say, with any degree of certainty, which will be adopted by the Government of India.

¹ Vol. XXXIV. (No. 154), JOURNAL of the Royal United Service Institution. Colonel Mark Lever Bell's "The Defence of India and its Imperial Aspect."

There are, however, certain indications that the most probable scheme of defence will be that of an advance into Afghan territory. Thus, for instance, the report of the 2nd November, 1892, by the Government of India, touches upon the defence of that country. It clearly states that the fixed belief of the Government of India is the necessity for an offensive mode of operations in the event of a hostile approach of the Russians towards the Indian frontiers.

The following extracts from the said report will prove the accuracy of the deduction we have made.¹

"Section 10. Necessity compels us to organise considerable forces for the operations against an European opponent beyond our frontiers.

"Section 12. The necessity for such action is most pressing at the present time, for it must be borne in mind that our Army may have to meet an enemy incomparably stronger than any it has yet met, and that in a severe climate, unfavourable to the inhabitants of the tropical districts of India.

"Section 25. It may therefore, be taken to be proved that, in the event of a big campaign beyond the North-Western Frontier, our field army should be composed principally of Sikhs, Punjabis, Pathans, Baluchis, and Gurkhas."

The extracts we have quoted clearly express the opinion of the Governor-General of India with regard to the necessity for an offensive mode of operations in the event of any attempt by Russia to occupy Afghanistan, either by force, or with the consent of the Ameer.

If this view of the situation is firmly established, it is most probable that, as soon as Russia starts military operations against Afghanistan, the English troops will occupy a line between Kabul, Ghazni, and Kandahar, three main points forming the centre of communication between Afghanistan, India, and Turkestan, and also between Southern and Northern Afghanistan. This line is considerably shorter than the line from Peshawar to Kandahar or Sukkur.²

Such a disposition of the English troops combines defensive and offensive advantages, and is a medium between a passive defence on the line Peshawar-Kandahar, and an offensive movement on Herat and Balkh. Being the most probable one, it will be taken for granted in drawing up our plans for the second and third campaigns.

¹The *Imperial and Asiatic Quarterly Review and Oriental and Colonial Record*, July, 1893.

² Kabul to Kandahar is 297 miles; Peshawar to Sukkur is 491 miles.

(To be continued.)

[A Map of the District was published in the JOURNAL for December, 1899.]

THE ENGLISH GENIUS AND ARMY ORGANISATION.

By the late General Sir GEORGE CHESNEY, R.E., K.C.B., etc.

A LECTURE DELIVERED AT THE ROYAL UNITED SERVICE INSTITUTION,
MARCH 27TH, 1874.

Field-Marshal H.R.H. the DUKE OF CAMBRIDGE, K.G., etc.,
in the Chair.

[Reprinted by special request.]

MAY it please your Royal Highness, Ladies, and Gentlemen,—I feel as if an apology were due to this distinguished company, containing, as it must do, a large number of persons whose practical experience and professional knowledge far exceed mine, in venturing to come before you with a proposal of the kind indicated by the title of my lecture; but I may explain at once that I am not going to trespass upon your attention by putting forth any definite or precise scheme for Army organisation. Such schemes have, I believe, on more than one occasion been the subject of discussion in this theatre; and it has struck me that, however intrinsically excellent they may have been, they laboured under the defect of being a little unsuited to the practical condition of the case. In a country where the Army establishments are voted year by year, and where the strength of those establishments is liable to fluctuation almost from day to day with the varying current of public opinion, it surely becomes a useless, not to say pedantic, occupation to build up fanciful schemes on paper for regularly organised army corps, or anything else after the Continental system, when there is not the smallest likelihood of their being ever carried out. That the English military establishments are maintained on this uncertain footing may be a good or a bad thing for the country, but this at least appears certain, that the strength of the Army is dependent ultimately on the state of public feeling; and, in the present temper of the country, any notion of emulating the gigantic and methodical organisations of Continental States is, of course, not to be entertained for a moment. Should any great crisis arise in the fortunes of the nation, then, no doubt, the nation, would be found equal to any degree of effort and sacrifice; but for the present, in our existing happy state of peace and prosperity, the limits within which the question of Army organisation may profitably be regarded are comparatively restricted. But within these limits there is to be found, I venture to think, the means whereby, without departing from the sober moderate line of

conduct which is in harmony with English sentiment, the relative importance of English armaments, and the relative might of English arms, may be made susceptible of increase in an extraordinary degree. Yet, in endeavouring to explain the reasons on which that opinion is based, I feel very strongly that I may not be able to do full justice to the subject, if only from the inadequacy of the time available. In the few observations, therefore, that I shall venture to submit, I cannot attempt to do more than to put forward what, to use an expression with which we are all familiar, may be termed a "general idea," the development of which, however, if it is found to be worth anything, may safely be left to other and more competent persons to work out.

I have said, Sir, that in the present temper of the country, large armaments, in the sense in which the term is understood by Continental nations, are not to be thought of. And it will perhaps be said by many that the question whether large armaments are necessary is becoming every day less of a practical nature, for that the policy of the nation is distinctly assuming a more pacific character. However that may be, this, at least, I take to be true: the national feeling may be more pacific in one sense, so far that it is disposed to contract the circle of issues for which the nation would be prepared to go to war; possibly a greater amount of provocation might be necessary now than would have been required 70 years ago to compel it to resort to the arbitrament of arms; but I think everyone will agree that there is no symptom whatever that the nation would be satisfied, if it should ever be compelled to go to war, to enter upon that war in the attitude of a second-rate Power. The sense of national dignity, we may venture to assert, is as high now as it was in the days of Chatham and Pitt. If England is to go to war at all, it must be as a first-class Power.

But it is very important to observe, that accompanying that proud sense of what was expected of them by their countrymen, which animated the Parliaments and the Ministers who carried on the great struggle of the Revolutionary war, and enabled them, notwithstanding the blunders and shortcomings which marked the course of our military measures in those days, to bring the struggle to a successful issue—although the aims of our rulers were lofty and their courage never failed them, their conceptions of the proper course to pursue, and their actual execution of measures for giving effect to it, always fell woefully short of the required standard. The intentions were excellent, but the execution was feeble. England always intended to fulfil the rôle of a first-class Power, only she never seemed to know how to set about doing it. Indeed, it cannot be said that, since the days of Marlborough, England has ever actually played the part of a first-class military Power. I am speaking, of course, of military, not of naval operations. Even in Marlborough's days, indeed, the actual force of English troops was inconsiderable; the strength of his army, as everyone knows, was eked out with allies; still the English as represented by Marlborough's army, were opposed throughout the war conducted by him to the main body of our adversary's troops, and did not operate, as has usually been the case since, on secondary lines and as a

diversion to distract the enemy from the principal theatre of war. The military genius of the great Chatham, on the other hand, vigorous and able though it was, still was dissipated over isolated enterprises in distant parts of the globe—in North America, in West Indian islands, in India; the assistance given to our ally of Prussia in his dire distress was never more than inconsiderable, although it was after all on the Continent that the struggle had to be settled. And the want of appreciation of the true principles of making war, manifested by Chatham's illustrious son, has been sufficiently commented on by a great writer. During Pitt's long administration, England was a first-class power only at sea; our military enterprises regarded as means for putting an end to a tremendous war were simply contemptible, and for the most part failed signally, as they deserved to do. And if a giant like Pitt came short of appreciating the true principles of conducting war, far less was it to be expected that the men who on his death wrapped themselves in fragments of his mantle would display any better knowledge of the matter. In the "Life of Perceval," just published, you will find an interesting and amusing episode which bears on this point, wherein Mr. Perceval, who was Prime Minister and Chancellor of the Exchequer from 1807 to 1812, takes the Duke of Wellington, then just created a peer for Talavera, to task for spending more than the three millions which the Chancellor had provided as the annual sum available for carrying on the Peninsular War with. "How extremely irregular," says Mr. Perceval, writing to the Duke in 1810—"how extremely irregular, when I have so many other expenses to meet, to draw a larger bill on me than I had agreed to accept!" And when Lord Wellington replies that he is very sorry to have incurred his displeasure, but that he really did not spend more money than he could help, the Prime Minister writes in effect:—"I don't mean to say that I am exactly angry with you, only you must not do it again; and it is perhaps just as well that you did not report the irregularity beforehand, for if I had known that the war was going to cost five millions a year instead of three millions, I should certainly have withdrawn you and your army from Spain altogether." Thus we see among other things how times have changed; for assuredly a Chancellor of the Exchequer at the present day would think himself very lucky to get out of any war at all at the rate of five millions a year, to say nothing of a big one. Mr. Perceval evidently regarded the service of the war as a thing to be provided for by a periodical assignment, after all other expenses had been met, much as a private gentleman might set aside a fixed sum every year for the expenses of his hunting stable or his yacht. Well, after Mr. Perceval's death, Lord Wellesley was invited to take the head of the Government, and he endeavoured to obtain the co-operation of Lords Grey and Grenville, with a view of forming a strong united Administration out of the two great parties. Lord Wellesley, I need not say, was the Duke of Wellington's eldest brother, who had returned from India not many years before, after a very brilliant career, and was perhaps the one man of his time who understood how war ought to be carried on. When he got to India, he at once put an end to the pottering, half-hearted way in which it had been

usual to conduct wars out there before his time ; he organised our forces on a scale commensurate with the object in view, put able commanders at the head of them, and swept our enemies away, and in fact made the British Empire very much what it is, as regards extent and supremacy, at the present day. Well, when Lord Wellesley came home, he at once saw that we were carrying on the great war—a great war as regards our share in it only so far that we took a great time over it—in a very dawdling fashion ; and he made it a condition of assuming the head of affairs that a great increase of vigour should be imported into the matter, and especially that the army under his brother in Spain should be largely strengthened. Lords Grey and Grenville, however, did not see it ; in their view the war was being carried on with as much vigour as the resources of the country would admit of. The negotiations were broken off, and Lord Wellesley's Government, as it happened, was never formed ; but the correspondence brings to light the popular view in those days—not indeed the popular view only, but the view taken by statesmen as well—on this head, which seems to have been that 30,000 soldiers was a good round number for a nation to go to work with ; a good deal of fighting might be got out of 30,000 men if you only kept at it long enough—and by going on for a few years, perhaps in the end something or other would turn up. It is true that the Duke of Wellington is reported to have said that he always received the fullest support from the Government of the day, and that if he had been supplied with more men in the Peninsula he should not have known what to do with them ; but then anything like a boast or insinuation that he could have done more if he had had more means, would have been utterly opposed to the Duke's character ; at any rate, there can be no doubt of the waste of the Walcheren Expedition ; and every reader of Napier's History will remember his lamentation over the diversion of a large force to Holland under Graham towards the end of the war in 1813—a large body of men utterly thrown away, but which, if they had been added to Wellington's army, would have enabled him to get to Paris as soon as the Allies, instead of finishing off at Toulouse.

Well, but perhaps it may be said, all this is very true, but what has that to do with us ? We are wiser in our generation. We know better nowadays. If one principle is more clearly established than another, it is that wars, if they are undertaken at all, must be short wars ; we have no intention of repeating the mistakes of former generations. Excellent, however, although our sentiments may now be on this head, is it the case that our practice has improved with them ? On the contrary, if we were unhappily ever drawn again into a Continental war, is there not great danger of similar mistakes being made again, and in even an exaggerated degree ? True, they might not re-appear in precisely the same form. No doubt the necessity would be felt for making a much more vigorous and immediate effort, and in one sense such a war would certainly be short, because our antagonist would unquestionably take care that it should not be a long one ; but so far as preparation goes, is there any evidence that we should have the means any more than we had sixty years ago of meeting any first-class military Power on equal terms ?

Is it not quite clear that even supposing the nation felt called upon to make a supreme effort, and to go into war on a large scale, that almost everything would have to be improvised for carrying out such a policy? We have, it is true, the nucleus on which a large Army might be formed, if sufficient time were allowed, but sufficient time is just what assuredly would not be available. I am speaking here of course of *offensive* war. For defensive purposes our position has no doubt been vastly strengthened of late years, and I for one venture to believe that as we now stand, a successful invasion of England has been placed beyond the category of possible events. But for offensive war we are really no better off than ever we were—rather we have fallen behind, because the scale on which warfare is conducted has become so enormously extended. Some persons, indeed, may be disposed to deny this assertion, and to cite what has been done of late years towards strengthening our field artillery, concentrating Line battalions at home, establishing a Reserve, and so forth, as showing that we have kept pace with other nations, and so amounting to a refutation of my assertion. And we may recollect a discussion carried on lately in the columns of a leading newspaper, when those who argued on one side, including the leading newspaper itself, showed that whereas the effective strength of the Army—that is, the strength available for taking the field after providing for dépôts and reserves and so forth—used not until lately to exceed 30,000 men or thereabouts, we could now send forth at least 60,000 men, with field artillery and cavalry in due proportion, and that therefore the military situation was in fact very complete and satisfactory. But admitting the facts, do they not convincingly prove the case contended for? When the forces of Continental nations are mustered no longer by regiments or divisions, or even army corps, but actually by armies within armies, and when their numbers are no longer counted by thousands, but almost by millions, what, I ask, does it really matter whether England could send into the field two army corps instead of one army corps, to contend against the 15, or 16, or 18 army corps which any one nation would bring against it? Is it not manifest, considered in this light, that the new establishment is practically just as insignificant as the old? That the sort of Army in point of numbers, that would be needed in case of a war has in fact still to be created, and that in the absence of any distinct scheme provided beforehand for creating such a force, with which to take a place adequate to the magnitude of the interest at stake and the spirit of the people, the outbreak of war would give rise to the same state of unreadiness and hurry-scurry that has been so often witnessed before, and that, failing recruits of our own, we should be casting about for recruits among the pauper communities of Europe wherever they could be found, and raising Turkish contingents, or German legions, or Spanish auxiliaries, perhaps even Ashantee levies—flesh and blood in some form wherever it could be found for our officers to lead, and to be got into shape for active service just about the time when the war was coming to an end, and they were no longer wanted.

Is there anyone, I ask, who does not feel, if he thinks about it at all, that this is what would certainly happen in such a case? And is this a

satisfactory outlook? Are we always to be taken by surprise in this fashion? And there is another point to be considered, that although our military organisation has thus stood still relatively, public opinion has undergone a great advance. Time was, as I have already observed, when even the rulers of the nation thought it a sufficient and satisfactory mode of making war to keep up 30,000 men or so on the scene of action, year after year, until something turned up, and national opinion was not educated in advance of the point reached by its rulers. But nowadays nobody either in or out of Parliament would be satisfied with making war in this pottering, lackadaisical fashion. The very fact that the country is so much more peaceably disposed than it used to be, and that it would not allow itself to be drawn into a quarrel except under grave provocation, indicates that if ever we do have to resort to arms, it will be for the maintenance of some great principle, to avenge some great wrong, to take a part in some momentous struggle, calling for a supreme effort. Suppose, then, such an occasion to arise; suppose the British lion to be at last aroused even beyond the point of roaring, just think what would be the feeling of the nation—its mortification, its rage, and indignation—to find that the whole Army could not suffice to do more than operate as a weak contingent on the flank of the German, or Russian, or French, or Italian Army, as the case might be; perhaps even as a contingent of the Belgian Army; or, if we are fighting on our own account, to find that the British Army was just strong enough to hold its own, intrenched in some corner of Europe, while the real issue was being fought out in a distant battle-field. That would not be a very dignified, proud, or very useful part for a great Power to play; and yet can any military man, or any other man, say that any other result is to be expected? That is, at any rate, the view which able Continental strategists take of the situation, when they conclude that English troops may for practical purposes be disregarded in political forecasts; and it is one which the British nation, if the situation were realised, would assuredly accept only with shame and indignation.

Well, then, after this jeremiad as to the awful consequences of neglecting to place ourselves on an equality with other nations, perhaps it may be expected that I am coming forward to propose what at first sight might appear to be the only other alternative. You are evidently, it may be said, a disciple of the bloated armament school; you go in for a conscription, enforced service, a large Standing Army, and all the rest of it? I reply that I propose nothing of the sort. And here, since I am sensible that my lecture, so far, may be thought to bear a warlike, not to say pugnacious, aspect, I would take the liberty of making the confession—a bold one, perhaps, to venture upon in the present company—that I regard war as at best a brutal occupation. For success in war is not found arrayed on the side of right and justice, but on that of might and cunning. If you happen to possess the cleverest general of the time, and to have made the most careful preparation, then you may hope to have the God of battles on your side too, but not otherwise. If, too, war develops some noble qualities, it also develops some very ignoble ones; while that

desire, so often evinced and so much commended—the desire to see service—is it not traceable at bottom to a small feeling of personal vanity? So much by way of disclaimer, and lest it should be thought I am advocating a policy unsuited to the pacific tendency of the times. But although we may feel a moral disapprobation for the profession of the garotter or the burglar, there is no reason why we should allow our house to be broken into, or our teeth to be knocked down our peaceful throats. War, like the gout or the toothache, or many of the other ills of humanity, is not to be got rid of merely by disliking it; and if, unhappily, we should ever have to go to war, a vigorous offensive may prove the best defence. And the question is whether there is really no alternative between the bloated armaments, conscriptions, and all the rest of it, and political effacement. I venture to think that there is; and that just as the happy situation of our sea-girt isle procures us immunity from attack within, so there may be found in the national character and genius the means whereby we may be able to exert a successful influence in the cause of right abroad, without imitating or emulating the military systems of foreign nations. This, then, is the question which I am now going to submit for your consideration, premising, as before, that the limits of time available will not permit of my putting forth more than a general idea, for abler and better informed men to develop, if it is worth anything, into useful shape.

In the first place, then, I would observe, that if it be asked what are the characteristics which specially distinguish our fellow-countrymen from the other nations of Europe, the ready and true reply would be, that Englishmen are distinguished by their love of freedom, their aptitude for self-government, their energetic temperament, their readiness of resource, and their faculty of invention. No doubt if the picture were drawn by a foreign artist, the colours would probably not be laid on quite so thickly as in the portrait of the British lion painted by one of the species; still, without undue vanity, we may venture to lay claim to these qualities. No other nation has manifested so much independence and originality in political life, so much energy and aptitude for commerce and colonisation, so much inventiveness in the arts, as witness what has been done in railroads, telegraphs, and manufactures of all kinds. It is true that we find across the Atlantic a yet more striking development of these qualities; but, as regards the nations of Europe, we may fairly claim to have taken the lead so far in these matters, whatever may be the case in the future. The same thing holds good as regards maritime affairs, not only in the arts of peace, but in the arts of war. It is the English who have discovered or worked out almost all the improvements of late years in the construction and armament of ships-of-war, other nations being usually content to adopt our patterns, just as we are beginning to discard them in favour of something else.

But, on the other hand, while we have thus led the way in these things, our military policy has been essentially imitative. Every part of our military organisation—the equipment, the drill, the armament, even

the clothing—everything is borrowed from some or other of the Continental Armies. We have been content to follow instead of showing the lead. It is the same in small things as well as great. They arm with breech-loaders; we do the same. The French, the first military nation, put leather round the edge of their trousers; we follow suit. The Germans are victorious, and wear their trousers tucked into their boots; we discard the leather edging for boots accordingly. So with regard to almost everything else. We may produce better guns, and turn out stronger harness than other nations, but the ideas which underlie these things are borrowed in the first instance. So is our organisation by regiments, and brigades, and divisions, and army corps. The only point in which we display any originality is in our omission to supply the rank and file—we imitate them in everything but that.

But next, look at the reduction which I may term the imitative or convenient mode of organisation causes in that part of it which is already in our small Army, weakest, the strength of our fighting-men, or rank and file, owing to their withdrawal for all kinds of services, as servants, batmen, and what not, which goes on in war-time, over and above the same reductions as occur in peace-time, for guards of all kinds, men under punishment, and so forth. The assumed untrustworthiness of the private soldier—and the whole theory of the Regulations assumes that he is untrustworthy—is the cause of the loss in the nominal strength of effective soldiers. If a cask of rum has to be sent from one station to another, there must be a corporal's guard sent with it. The theory of the service is, that the private soldier can never be trusted to go anywhere or do anything by himself. He is always in charge of a non-commissioned officer. But I need not enlarge on this point in such company. Every regimental officer knows how great is the difference between the nominal and the effective strength of any body of troops. And the reduction, be it observed, is not so much in the upper ranks or the staff; it is the rank and file which dwindles away.

But the great loss is from sickness. Here, too, again in the men. It is not, as a rule, the officers who suffer in the great epidemics in India; the effect of these terrible outbursts is usually confined to the men; the officers for the most part get off lightly. They know, for one thing, how to take care of themselves, and the men do not. And this loss goes on with still greater rapidity in war-time, both because the stress of war on the health is heavier, and because the exigencies of war compel greater laxity in the choice of recruits; a lower and less healthy stratum has to be tapped. Everyone will remember the published request of Lord Raglan in the Crimea, that more recruits should not be sent out, because they were swept away like flies as fast as they arrived. Observe, too, that in the withdrawal of men for various extra duties, the choice is mostly determined by the roster, without reference to the relative fitness of the men for their different duties. The best shot or the strongest man may be left behind to guard some stores just before the battle, while the puny recruit is sent to the front.

Well, then, it being evident that England is always destined to act with a small Army, that in all Armies as now organised there must be a great reduction of the nominal strength from non-effectives, and that this reduction tells much more upon an Army which is already weak in rank and file,—how would it do to strike out an entirely new line for ourselves, to give up hankering after numerical strength, and to go in boldly on new lines of our own with a new sort of Army, in which quality should atone for lack of quantity, and thus to attempt a complete revolution in the art of war, as we have already effected a revolution in so many of the arts of peace? We do something of the kind in India even now. There, although we have an unlimited material for soldiers available, we import a limited number of soldiers of a special and very costly kind, white men among dark; and, having got them there, we keep them specially for fighting. There are no non-effectives among the British troops in India; the duties outside the actual fighting are relegated to a less valuable agency; and every European soldier—except the sick—is to be found in his place in the line of battle. How would it do, then, to aim at the same sort of thing here? To have a small Army, but in which not only should every soldier be effective for the actual business of fighting, but every soldier should be as superior to the ordinary conscript of Europe as the British soldier in India is to the ordinary sepoy of a native chief? An Army of really picked men—for remember it is not until you go above the lowest social stratum that you come to the typical Englishman, the sturdy, well-fed representative Englishman—men self-reliant, intelligent, fit to take care of themselves; an Army in which guards, and cells, and punishments would be unnecessary, but in which even a stronger discipline could be maintained than is possible now, just as higher discipline can be exacted from officers than from privates, because a sense of duty and honour acts, and not only a sense of fear—an Army from which it should be a punishment and a disgrace to be dismissed. With such an Army as this, might not Great Britain effect a revolution in modern European warfare, just as she has effected a revolution in Eastern warfare, by making skill and originality atone for the want of numbers?

But now, it will be asked, how do you propose to set about this change? Skill and courage may be all very well, but a bullet will go through a man's head without any reference to the quantity of brains inside it, or to his girth round the chest. Numbers must tell, whether of infantry against infantry, or cavalry against cavalry. If your small Army comes in contact with one of the huge Continental Armies, it is to be feared that, your picked troops notwithstanding, providence will still be found on the side of large battalions. But perhaps, it may be said, you mean to propose an Army composed wholly of artillery, or of *mitrailleuses*, or—on the principle that there is nothing like leather—an Army of engineers engineers, to advance irresistibly behind a rampart of earthworks, as the soldiers of the Grecian phalanx did behind their big shields. I am not, however, going to propose either the one or the other. The Army of the future, in my view, should be an army of horsemen, not merely cavalry or mounted riflemen, but men trained to the highest degree of excellence

in either line; men who should be to other soldiers what the knights of old were to the ordinary men-at-arms—a body quite irresistible; which would sweep away any cavalry of the kind that is commonly to be found in Armies, and which, able to move and operate with great rapidity in any direction, would be equally beyond overthrow by any infantry that could be brought against it.

Imagine a force of this sort, of say only 30,000 men, landing anywhere on the Continent, under a bold leader; what is to prevent it from marching from one end of Europe to the other? The enemy's cavalry could not stop it; our force would want nothing better, indeed, than that there should be an opportunity of meeting it and crushing it; but practically, after a little experience of such a foe, the enemy's cavalry would not keep the field. Yes, it may be said, but there still remains the infantry, and what is to be done against their overwhelming numbers? Well, no doubt, a body of 300,000, or 200,000, or even 100,000 men, occupying a line of country or a line of battle, forms a very imposing force, and has an advantage over a smaller army opposed to it, provided, that is, that the smaller force plays their game, advancing or retreating on the same front, and so being everywhere at a disadvantage. But our Army of the future—our British knights—would, of course, do nothing of the sort. They would be able to concentrate and cut through the opposing army at any point, but they would naturally gain a flank, and operate on it, which their power of quick movement would enable them to do. A part of the force being dismounted for the occasion, would attack and drive back the extreme flank of the enemy's line, and this body thrown into confusion, our reserve would come up and join in the pursuit, driving back the beaten enemy across and upon their own line. And the pursuers being once mixed up with the pursued, the latter's wealth of guns and musketry becomes of no avail. They cannot fire upon their own troops. Attacked in this way, large Armies might cease to be formidable. If you allow the assumption that the English nation could furnish such a force as I have been describing, and if it be admitted as a further consequence that such a force, by its rapidity of movement, would be able to take the initiative at any point of the enemy's line, and could also be superior to the enemy at any one point, then might it not be possible to roll up the largest of Armies of modern times, just as Frederick rolled up the Austrian line at Leuthen? After the first impact, the loss would be small. Artillery and even infantry fire require the object to be at a certain interval to be harmful. It is true this mode of attack is, in one sense, the sort that is practised now, the usual object being to gain the enemy's flank, and roll back his line upon itself; but then it is seldom possible to execute this manœuvre completely, because the one side has not the means of moving faster than the other, and, besides, the need is always recognised of covering your own communications, which interferes to prevent such a manœuvre being attended with decided results. But I assume that in this case you would strike boldly, without any regard to keeping your own rear open, on the principle that the confusion caused to

the enemy by cutting in upon his communications would far more than compensate for the inconvenience of losing hold of your own for a time. And imagine, indeed, what would be the effect of 30,000 or 40,000 horsemen—horsemen fit to act together, or fit to act alone—men able to ride across country, across any country—in Europe, riding to and fro in rear of an army, intercepting its communications, cutting off its supplies, destroying its reserve, ammunition, and material, creating confusion and panic far and wide. Is it not clear that the larger the enemy's Army, the greater would be its resulting confusion and disorganisation? Such a mode of attack, carried out boldly and without fear of consequences or regard to conventional rule, would, I believe, utterly cripple and confound an opposing Army of vastly larger size. 30,000 men in this way might hold in check 300,000.

This, then, is the general idea which I have to offer for consideration, a humble contribution towards the subject which is and has been occupying so many active minds, an idea suggested partly by what happened in the great American war, partly from what has been already put forward by others. Time does not admit of my endeavouring to elucidate the various points which need it, or of replying by anticipation to the various objections that might be brought against such a scheme—and I think it would not be difficult to name a few. I would observe, however, that I do not suppose the creation of this new force would obviate the necessity for infantry, or artillery, or engineers; only—and here is the main point—instead of these horsemen being merely a subsidiary body, that the other branches would act in offensive warfare as auxiliaries to the fighting first line, composed of these, our irresistible horsemen.

One word as to cost. If service in the Army, or, at any rate, this branch of it, is to be prized and sought after, there must be a complete revolution in the work of recruiting and the scale of pay. But this is not really an alarming prospect. Even in peace-time the actual pay of troops is not the main element of cost, and in time of war it becomes perfectly insignificant. The Crimean War cost, I believe, eighty millions sterling, out of which the pay of the soldiers was a mere trifle; and if by paying each man five or six shillings a more robust article had been obtained, and the casualties from sickness thereby reduced in any considerable degree, the money would have been saved over and over again.

It may be objected, perhaps, what is to prevent other nations from possessing themselves of our secret? Should they do so, should they attempt to adopt our system, then, not to say that this would be the strongest possible testimony to its merits, could we ask anything better than that our adversaries should meet us on our own terms, and in the mode of warfare which we have deliberately adopted as that best suited to our national genius? Can any Englishman doubt what the result would be? But it is more likely that they will stick to their conscriptions and their big muster-rolls, and give us, should war unhappily arise, the opportunity of repeating once more the experiment so often tried before, so often in India, and now, lastly, in

Africa, of pitting skill and resolution against numbers. Should that day come, and those of us at home, when viewing in the mind's eye the odds opposed to their countrymen in the field, be led to cry, in the words of one of England's greatest monarchs on a like occasion :—

“ O God of battles, steel my soldiers' hearts :
Possess them not with fear : take from them now
The sense of reckoning, if th' opposed numbers
Pluck their hearts from them ! ”—

then will those gallant men reply—men not in the desperate case of the heroes of Agincourt, of whom their antagonists said scornfully :—

“ Yond' island carrions, desperate of their bones,
Ill-favour'dly become the morning field :

.

Big Mars seems bankrupt in their beggar'd host.

.
The horsemen sit like fixed candlesticks,

With torch staves in their hand ; and the poor jades

Lob down their heads, dropping the hides and hips ”—

not men and horses in this doleful plight, but the cream of British manhood mounted as they could and should be mounted,—then may each man of the gallant host reply in his heart, in the words of the same heroic king :—

“ The fewer men, the greater share of honour.

.

No, 'faith, my friends, wish not a man from England.

God's peace ! I would not lose so great an honour,

As one more man, methinks, would share from me,

For the best hope I hope ”—

and so saying, ride on to victory.

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made : Rear-Admirals—The Right Hon. Lord C. Beresford, C.B., to be Rear-Admiral of the Mediterranean Fleet ; Burges Watson, M.V.O., to be Admiral-Superintendent of Malta Dockyard. Captains—F. E. Brock to "Highflyer" ; H. B. Jackson to "Vulcan" ; H. L. F. Royle, D.S.O., to "Katoomba" for charge of Naval Establishment at Sydney ; H. L. Fleet to "Howe" ; G. F. King-Hall to "Revenge" ; R. S. Lowry to "Ramillies."

Lord C. Beresford, who has been appointed to succeed Sir G. Noel as Rear-Admiral in the Mediterranean Squadron, will hoist his flag on board the "Ramillies," which for the last six years, prior to the arrival of the "Renown," has been the flag-ship of the commander-in-chief ; Captain R. S. Lowry, who was Lord Charles's commander in the "Undaunted," goes with his old chief as flag-captain. The first-class cruiser "Europa" left Portsmouth on the 5th ult. with a new crew for the "Revenge," which has paid off and recommissioned at Malta, and she arrived at Portsmouth on the 22nd ult. with the relieved crew ; she leaves again almost immediately with a new crew for the "Ramillies," which also pays off and recommissions at Malta. The second-class cruiser "Latona" commissioned at Portsmouth on the 12th ult. to take out a new crew for a sister ship, the "Indefatigable," on the North-American station, and she left Portsmouth on the 21st ult. for Bermuda. The second-class cruiser "Highflyer" commissioned at Devonport on the 7th ult. to relieve the "Eclipse" as flag-ship on the East Indian station ; but before proceeding to her destination she is to be temporarily attached to the Training Squadron, for which purpose she left Plymouth on the 22nd ult. for Gibraltar. The third-class cruiser "Bellona" left Portsmouth for the Mediterranean on the 4th ult., and the third-class cruiser "Scout," which commissioned at Portsmouth on the 5th ult., left on the 18th also for the Mediterranean. The first-class torpedo-gunboat "Dryad" commissioned at Chatham on the 7th ult. to relieve the "Dryad," a sister vessel, in the Mediterranean. The first-class gunboat "Goldfinch," from the Australian station, paid off at Sheerness. The first-class gunboat "Sparrow" arrived at Plymouth on the 25th ult. from the West Coast, and will proceed to Sheerness to pay off. The first-class battle-ship "Anson" arrived at Plymouth on the 28th from the Mediterranean, and will pay off at Portsmouth ; she is the last of the Admiral class to be brought home from foreign service.

Steam Trials.—Last month we published a *résumé* of the results attained during the steam trials of the new first-class battle-ship "Ocean." A sister ship of the "Ocean," the "Goliath," built at Chatham and engined by Messrs. Penn, of Greenwich, has also just concluded her steam trials, and the results show that, after allowance has been made for the difficulties which frequently attend the first trials of new machinery, the "Goliath" is able to hold her own with the sister ships of her class, of which one—the "Canopus"—has just been commissioned at Portsmouth.

There were three trials—two of 30 hours' continuous steaming, the first at 2,700, and the second at 10,250-I.H.P., both of these being to test the coal consumption at these powers. The third trial was a continuous 8 hours' run at full speed, or 13,500-I.H.P.

For the purposes of the first of these trials, the ship left Sheerness on 27th September, and proceeded down the Channel, the engines working well for 18 hours of the steaming time, until being off the Isle of Wight, when the joint of the high-pressure cylinder cover of the starboard engines gave out, and the set had to be put out of running until the fault was made good, the port set of engines continuing the running in the meantime, and developing 1,350-H.P. After making good the defective jointing, etc., occupying 7 hours, the 30 hours' trial was proceeded with to a satisfactory finish, the mean results attained being as follows: With the ship practically on an even keel—her water draught being 26 feet forward and aft—her boilers under a working steam pressure of 236 lbs. per square inch, and the starboard and port engines running respectively at 65·8 and 65·6 revolutions per minute, the mean I.H.P., realised by them was 1,467 and 1,340, or a total of 2,807, which exceeded that contracted for by 107-H.P. This power was developed by a coal consumption of 1·73 lbs. per I.H.P. per hour, the speed of ship realised being 11·7 knots in the same time. This trial was completed on Friday, 29th September, the ship having been abreast of the Start, when she resumed her trial run with both sets of engines.

On the 10th October the second coal-consumption trial of the "Goliath" at 10,250-H.P. took place to the westward of the Eddystone, commencing at noon of that day, and finishing on the evening of the 11th, the mean results attained at it being:—With the ship at the same water draught as on the first trial, and her boilers working at a pressure of 273 lbs. per square inch, the starboard and port engines made 99·5 and 101·7 revolutions per minute, and developed 5,160 and 5,253-H.P. respectively, or a total of 10,413-I.H.P., being 163 in excess of the contract, the coal consumption being 1·54 lbs. per I.H.P. per hour, and the speed attained by the ship 17·1 to 17·32 knots in the same time. The stokeholds were under no air pressure during either of these coal-consumption trials.

Some defects having been discovered in the pump arrangements of the engines of the "Goliath" on the completion of the foregoing described trials, the ship was delayed until these were rectified before proceeding on the 8 hours' full-power trial, which took place in the Channel on 22nd November, when the following satisfactory results were attained:—With the ship at the same water draught as on the previous trials, and steam at a boiler pressure of 290 lbs. per square inch, the revolutions of the starboard and port engines were 108·1 and 109·8 per minute, and the power developed by them 6,998 and 6,920 respectively, or a grand total of 13,918-I.H.P., being 418 in excess of that contracted for; an eminently satisfactory result, both engine and boilers having worked remarkably well, the coal consumption on the trial having been 1·91 lbs. per I.H.P. per hour, and the speed of the ship in the same time 18·4 knots.

The new second-class cruiser "Hyacinth" has completed her speed trials off Plymouth. The engines worked smoothly throughout, the power developed being considerably in excess of the amount stipulated for in the conditions of contract. The mean results were as follows:—Steam in boilers, starboard 252 lbs., port 251 lbs.; at engines, starboard 242 lbs., port 240 lbs.; vacuum, starboard 25 inches, port 26·9 inches; revolutions, starboard 169·15, port 173·5; I.H.P., starboard 5,269, port 5,267—total, 10,536; speed, 19·4 knots; coal consumption per I.H.P. per hour, 1·58 lbs.; air pressure, 25 inch for last 5 hours.

The 3 hours' commissioning steam trial of the "Highflyer" took place on the 22nd ult. off Plymouth and proved successful. The mean pressure of steam in

boilers was 275 lbs., at engines 245 lbs.; air pressure in stokeholds, 23; vacuum in starboard engines, 25·8, port 25·5; revolutions, starboard 175·5, port 174·4; mean I.H.P., starboard 4,736, port 4,677—total, 9,413; and mean speed by patent log, 18·8 knots. The ship afterwards left for Gibraltar.

A Speed Test.—The second-class cruisers "Highflyer" and "Minerva" are to be placed in the balance in order to test their respective steaming capacities. The two ships are the same in displacement and dimensions, but differ in armament, engines, and boilers. The "Highflyer's" engines develop 10,000-H.P. with natural draught; her boilers are of the Belleville type, eighteen in number, fitted with economisers. The "Minerva's" engines develop 9,600-H.P., and her boilers, eight in number, are of the Scotch type. The following trials are to be carried out:—

No. of Trials.	Series.	Duration in hours.	Speed.
3	A	60	10 knots.
2	B	60	14 knots.
2	C	60	17 knots.
2	E	12	{ Highest speed that can be maintained.
2	D	30	
2	F	12	

In series E the "Minerva" is to start with three boilers only lighted and at a given signal to light the rest. The "Highflyer" will start with six boilers lighted, and at the signal will light up the other twelve. This test is to ascertain the speed at one-third the full boiler power, though, as a matter of fact, the "Minerva's" three boilers are slightly in excess of one-third power. In series F each ship will start with one-third of the boilers alight, but in the "Minerva" the others will be banked, and in the "Highflyer" fires only laid. After steaming from 18 to 36 hours at a low speed, at a given signal the two will spread fires, or light fires, and put on all available steam. Each ship will, during the trials, carry an inspector of machinery, two additional engineer officers, and a number of extra-engine-room ratings.

Prize Firing on the Mediterranean Station.—The results of last year's prize firing have just been issued. The best records are:—

Heavy gun prize firing (*i.e.*, 9·2 to 13·5-inch guns).—"Illustrious," 12-inch guns, percentage of hits to rounds fired, 55·0; "Revenge," 13·5-inch, 53·8; "Cæsar," 12-inch, 52·0; "Ramillies," 13·5-inch, 50·0; "Empress of India," 12-inch, 46·4.

Six-inch Q.F. guns.—"Empress of India," 46·9; "Scylla," 45; "Ramillies," 42; "Revenge," 38.

4·7-inch Q.F. guns.—"Scylla," 80; "Vulcan," 51; "Thetis," 42·4; "Hazard," 41; "Hebe," 35.

Six-inch Q.F. guns.—"Anson," 26·3; "Rupert," 13·3; "Camperdown," 17.

Light Q.F. guns.—"Empress of India," 49·1; "Thetis," 47·5; "Salamander," 43·9; "Renown," 40·6; "Hood," 36·2; "Hawke," 36; "Cæsar," 32·6; "Hebe," 31·2.

Machine guns.—"Melita," 1-inch Nordenfeldt, 2-barrel, 35·3; "Anson," 45-inch Nordenfeldt, 5-barrel, 21·7; "Cockatrice," 1-inch Nordenfeldt, 2-barrel, 20·7; "Ramillies," 45-inch Maxim, 20; "Vulcan," 1-inch Nordenfeldt, 2-barrel, 19·8; "Thetis," 45-inch Nordenfeldt, 5 barrel, 16·1.

The most notable item is the percentage obtained by the "Scylla," viz., 80 per cent. of hits for rounds fired with the 4·7 Q.F. guns. Her prize firing was carried out in a slight swell, and out of 70 rounds she fired, no fewer than 56 were hits.

Official Return of the Fleets of Great Britain and Other Powers.—A Parliamentary paper has just been issued showing the fleets of Great Britain, France, Russia, Germany, Italy, the United States of America, and Japan, distinguishing the various types of vessels built and building. The return shows the date of launch, the displacement, and the armaments reduced to one common scale. The last time the return was issued was in May, 1898. Vessels which appeared on October 15th, 1899, in the official list of each Navy as built or building are enumerated, including under the latter head those for which on that date money had been appropriated and which were shortly to be laid down. The following tables exhibit the total number of vessels in each class belonging to each nation :—

Vessels Built.

	Great Britain.	France.	Russia.	Germany.	Italy.	United States.	Japan.
Battle-ships	53	31	12	18	15	5	3
Cruisers, Armoured	17	8	10	3	3	2	3
„ Protected	107	36	3	13	15	14	14
„ Unprotected	15	14	3	21	1	6	9
Coast-Defence Vessels, Armoured	13	14	15	11	—	19	4
Special Vessels	3	1	5	3	2	1	—
Torpedo-vessels	35	15	17	2	15	—	1
Torpedo-boat Destroyers	75	2	1	1	—	1	8
Torpedo-boats	95	219	174	113	144	16	29

Vessels Building.

	Great Britain.	France.	Russia.	Germany.	Italy.	United States.	Japan.
Battle-ships	17	4	12	7	4	11	4
Cruisers, Armoured	14	12	12	2	4	3	4
„ Protected	9	4	8	4	3	7	2
„ Unprotected	—	—	—	—	—	—	—
Coast-Defence Vessels, Armoured	—	—	1	—	—	4	—
Special Vessels	—	—	2	—	—	—	—
Torpedo-vessels	—	—	—	—	—	—	—
Torpedo-boat Destroyers	33	10	35	9	11	19	4
Torpedo-boats	—	47	6	—	10	14	29

France has three submarine boats built and nine building. No other Power has any vessels of this class either built or building. We propose in next number of JOURNAL to make an analysis of this Return.—*The Times and Naval and Military Record.*

Naval Expenditure and Mercantile Marine.—The following Return, showing Aggregate Naval Expenditure on Seagoing Force; Aggregate Revenue; Aggregate Tonnage of Mercantile Marine; Annual Clearances of Shipping in the Foreign Trade; Annual Clearances of Shipping in the Coasting Trade; Annual Value of Imports by Sea, including Bullion and Specie; and Annual Value of Exports by Sea, including Bullion and Specie, of various Countries, exclusive of China and South American Republics, but including British Self-governing Colonies, for the Year 1898.

Countries.	Aggregate Naval Expenditure on Senging Forces.	Aggregate Revenue.	Aggregate Tonnage of Mercantile Marine.	Annual Clearances of Shipping in the Foreign Trade.	Annual Clearances of Shipping in the Coasting Trade.	Annual Value of Imports by Sea, including Bullion and Specie.	Annual Value of Exports by Sea, including Bullion and Specie.
	£	£	Tons.	Tons.	Tons.	£	£
BRITISH EMPIRE							
United Kingdom	22,547,844 (a) (1897-98)	108,366,000 (Year ended 31st March, 1898)	9,001,860 (b)	45,838,622	54,462,061	528,779,342	346,227,689
India ...	313,293 { (c) } (1897-98) { (d) }	61,682,698 (Year ended 31st March, 1898)	46,903 (e)	3,866,869 (Year ended 31st March, 1898)	12,184,632 (Year ended 31st March, 1898)	60,243,043 (Year ended 31st March, 1898)	67,016,455 (Year ended 31st March 1898)
SELF-GOVERNING COLONIES (p)							
Australasian (r)							
New South Wales ...	47,215 (1897-98)	9,432,906 (Year ended 30th June, 1898)	121,279	3,455,061	No Returns	18,775,359	23,526,333
Victoria ...	60,134 (f) (1897-98)	6,875,459 (Year ended 30th June, 1898)	101,682	2,483,992	613,286	14,673,806	12,491,910
South Australia (except Northern Territory)	16,831 (1897-98)	2,612,730	50,986	1,760,167	No Returns	4,436,870	5,990,747
Northern Territory ...		67,119 (Year ended 30th June, 1898)	443	92,441	No Returns	113,960	182,596
Western Australia ...		2,604,943	11,350	1,189,732	No Returns	5,241,965	4,960,006
Tasmania ...	4,021 (1897-98)	908,223	15,154	542,119 (1897)	No Returns	1,850,015	1,803,369
New Zealand ...	20,814 (1897-98)	5,072,026 (Year ended 31st March, 1898)	90,995	765,793	5,901,434	8,230,000	10,517,955
Queensland ...	26,721 (1897-98)	3,768,152 (Year ended 30th June, 1898)	23,918	596,313	3,537,266 (g)	5,538,552	9,780,136
African—							
Natal ...	—	1,964,315 (Year ended 30th June, 1898)	3,195	1,262,231	No Returns	5,369,672 (h)	1,263,354 (h)
Cape of Good Hope ...	—	6,402,519 (Year ended 30th June, 1898)	2,191	2,789,989	3,927,311	16,679,834 (i)	25,318,701 (k)
American—							
Dominion of Canada ...	—	8,382,750 (Year ended 30th June, 1898)	672,222	6,219,683(m) (Year ended 30 June 1898)	14,162,880 (m) (Year ended 30 June, 1898)	23,833,504 (n) (Year ended 30 June, 1898)	33,730,003 (n) (Year ended 30 June, 1898)
Newfoundland	—	316,730 (Year ended 30th June, 1898)	107,174	337,145 (Year ended 30th June 1897)	No Returns	1,066,205 (Year ended 30th June, '98)	1,074,027 (Year ended 30 June, 1898)

NOTE.—Except where otherwise stated the figures refer to 1898. Where it has not been possible to give the particulars for 1898 the figures for the latest available year have been shown.

(a) Of this total £21,837,416 was ordinary expenditure, and £710,428 was expenditure under the Naval Works Act, 1897 (outside Navy Votes).

(b) Including the Isle of Man and Channel Islands.

(c) Expenditure in India converted into sterling at the official rate of 1s. 2½d. the rupee.

(d) Includes a contribution of £100,000 for Her Majesty's ships in Indian waters, and £59,600 for Her Majesty's ships and vessels for the Naval Defence of India. The balance represents expenditure on the Marine Department.

(e) In addition to the vessels registered under the Imperial Act of 1894, India owns some vessels of small tonnage registered under the Indian Act X. of 1841 these are not included in the table.

(f) Exclusive of expenditure on naval buildings and vessels which is included in a sum of £6,620, expended for defence works and buildings, and is not separately distinguished.

(g) Inclusive of the tonnage of vessels (2,674,131 tons) engaged in coasting voyages terminating beyond the Colony.

(h) Including the value of goods imported in transit for the interior.

(k) Including the value of gold, the produce of South African States, brought into the Colony overland and exported by sea.

(l) Including the value of goods entered for removal to places outside the Customs Union.

(m) Exclusive of the tonnage of vessels (6,208,926 tons) trading on the rivers and lakes between Canada and the United States.

(n) Total imports and total exports. Imports and exports by sea are not separately shown in the Canadian returns.

(p) The revenues of these Colonies are exclusive of loans raised.

(r) Includes contributions towards the maintenance of Her Majesty's vessels for protection of floating trade in Australasian Waters, as follows, for 1897-98 :—

New South Wales	£37,820	New Zealand	£20,814
Victoria	33,743	Queensland	13,762
South Australia	10,499		
Western Australia	4,021	Total	£125,500
Tasmania	4,841		

The annual contribution is £126,000, payable in advance. It was apportioned amongst the various Colonies on a population basis for the year commencing 1st April, 1899, as follows :—

New South Wales	£37,896	New Zealand	£20,924
Victoria	33,083	Queensland	14,030
South Australia	10,355		
Western Australia	4,732	Total	£126,010
Tasmania	4,990		

NOTE.—The above particulars with regard to naval expenditure have been furnished by the Admiralty. The remaining particulars have been extracted either from Board of Trade returns or from the official returns of the various Colonies.

Countries.	Aggregate Naval Expenditure on Seagoing Force.	Aggregate Revenue.	Aggregate Tonnage of Mercantile Marine.	Annual Clearances of Shipping in the Foreign Trade.	Annual Clearances of Shipping in the Coasting Trade.	Annual Value of Imports by Sea, including Bullion and Specie.	Annual Value of Exports by Sea, including Bullion and Specie.
		£	Tons.	Tons.	Tons.	£	£
Russian Empire	6,705,300	147,245,000 (1897)	905,804 (1897)	8,739,208 (a)	18,472,512 (a) (1897)	31,910,000 (b) (c) (1897)	49,060,000 (b) (d) (1897)
Germany	6,083,874 (1898-99)	70,644,000 (Year ended 31st March 1899)	1,555,371 (1897)	12,943,572 (1897)	3,683,056 (1897)	287,249,600	215,562,000 (d)
Netherlands ...	1,282,205	10,159,000	296,081 (1897)	8,630,822	—	Metric Tons. 11,445,900 (e)	Metric Tons. 2,385,000 (e)
France	11,988,718	139,552,000	900,288	17,001,603	6,908,913 (1897)	174,626,000	139,369,000
Portugal	787,112	71,961,000	77,835	8,981,434	1,298,024 (f)	14,798,000 (d)	10,835,000 (d)
Spain	1,007,621 (1898-99)	34,633,000 (1898-99)	657,924 (1897)	13,533,212	11,420,018 (1897)	23,341,000	30,883,000
Italy	4,248,545	48,208,000 (Year ended 30th June, 1898)	786,644 (1897)	18,635,415 (i)	11,108,319 (i)	45,088,000	28,405,000
Austria-Hung'y	1,206,772	Austria. 62,342,000 Hungary. 43,875,000	Austria. 168,038 (1897) Hungary. 57,037	Austria. 11,703,977 (1897) Hungary. 1,848,586 (1897)		13,569,000 (h)	9,505,000 (h)
United States (year ended 30th June) ...	9,725,742 p (1891-99)	102,966,000	737,709 (g)	21,891,731 (h)		148,319,000	255,022,000
Japan	8,867,566 (1897-98)	21,085,000(k) (1897-98)	318,394 (l) (18 7)	3,365,532 (1897)	3,733,614 (1897)	32,379,000 (m) (1897)	19,847,000 (m) (1897)

REMARKS.

NOTE.—The actual naval expenditure for any year is seldom known—never immediately—the figures given, therefore, are the sums voted.

With regard to the revenue and commerce of foreign countries, in converting the foreign currencies into £'s sterling the par value of the foreign money has been taken, except in the case of Japan, where the yen has been taken at its average exchange value in 1897, viz., 2s. 0½d.

(a) The figures refer to Russia-in-Europe, and the Caucasian points of the Black Sea.

(b) Special trade, *i.e.*, imports for home consumption or exports of domestic produce or manufacture, as the case may be.

(c) Trade by European sea-board, including also Finland.

(d) Total trade. Imports and exports by sea are not separately distinguished.

(e) The particulars as to *value* of trade by sea are not available.

(f) Portuguese vessels only.

(g) Registered for over-sea (*i.e.*, foreign) trade only.

(h) Exclusive of the tonnage of vessels (3,856,494 tons) engaged in the Lake trade between the United States and Canada.

(i) Certain vessels formerly included in the coasting trade are now classed under the head of "Liners" and included in the foreign trade.

(k) Include the Chinese indemnity.

(l) The tonnage of Japanese vessels is that of vessels of foreign type, excluding Junks.

(m) Including Formosa.

(p) This sum was the original estimate for the year 1898-99, but on account of the war the appropriations amounted to £22,705,901.

NOTE.—The above particulars with regard to naval expenditure have been furnished by the Admiralty. The remaining particulars have been extracted from the official returns of the various countries mentioned, except in the case of Spain and Portugal, for which certain figures have been extracted from the "Almanach de Gotha."

FRANCE.—The following are the principal promotions and appointments which have been made: Capitaines de Vaisseau—X. A. Foret to be Rear-Admiral; M. A. Lespinasse de Saune to "Descartes"; F. M. Salaün de Kertanguy to "Gaulois"; L. J. Berryer to "Jauréguiberry."—*Le Journal Officiel de la République Française.*

Bilge Keels.—The large battle-ships from the Mediterranean, which have taken the place in the Northern Squadron of the small coast-defence battle-ships, and which always showed themselves very steady and good gun-platforms in the short seas found in the Mediterranean, have, since becoming exposed to the long Atlantic swells, proved themselves heavy rollers. To try and remedy this defect, the "Redoutable" was lately fitted with bilge-keels, which showed their value during the recent cruise of the squadron, when a very heavy sea was experienced. The two new first-class battle-ships "Gaulois" and "Charlemagne" seem to have been the only ships of the squadron which were able to fight their heavy guns, although the roll of the "Redoutable" was no heavier than that of the "Gaulois," viz., 16° from side to side. The "Redoutable's" guns, however, are mounted on the broadside; but last year, with a much less sea on, before her bilge-keels were fitted she often rolled from 38° to 40°. During the same cruise the "Formidable" and "Amiral-Baudin" rolled 33°, while the "Amiral-Duperré" rolled as much as 38°. It is now certain that bilge-keels will be fitted to all the other ships of the squadron.

Steam Trials.—The following are comparative details of the trials of the new first-class battle-ships "Gaulois" and "Charlemagne." Twenty-four hours' run at two-thirds speed:—

	I.H.P.	9,200
"Gaulois" ...	Corresponding speed ..	16·5 knots
	Consumption of coal per	
	H.P. per hour	0·695 kilogramme

"Charlemagne"	I.H.P.	9,270
	Corresponding speed ...	16.41 knots
	Consumption of coal per	
	H.P. per hour ..	0.703 kilogramme

The results of the three hours' run at full speed under forced draught, for which the contract I.H.P. was to be 14,500, were as follows:—

"Gaulois"	I.H.P.	14,925
	Corresponding speed ...	18.02 knots
	Consumption of coal per	
	H.P. per hour ...	0.808 kilogramme
"Charlemagne"	I.H.P.	15,235
	Corresponding speed ...	18.136 knots
	Consumption of coal per	
	H.P. per hour ...	0.871 kilogramme

The third ship of the type, the "St. Louis," is expected at Brest from Lorient very shortly, when she also will commence her trials. The great defect in these three ships, a defect however which, we believe, has been remedied in the "Suffren," which is an improved "Charlemagne," is the lack of any armour protection between the armoured central citadel on the upper deck for the secondary battery and the upper edge of the thin belt of plating above the water-line belt.

The following are fuller details of the full-speed trials of the new first-class cruiser "Guichen," which were made on the measured mile off the Hyères Islands on the 9th November last:—

Duration of trial	3 hours				
Mean pressure on the boilers	15.300 kilogrammes				
Air pressure in stokehold	25 millimetres				
Temperature in engine-rooms	28° to 42° Réaumur				
Revolutions per minute of engines	<table> <tr> <td>Starboard—135.2</td><td rowspan="3">} Mean—136.38</td></tr> <tr> <td>Centre —136.8</td></tr> <tr> <td>Port —137.15</td></tr> </table>	Starboard—135.2	} Mean—136.38	Centre —136.8	Port —137.15
Starboard—135.2	} Mean—136.38				
Centre —136.8					
Port —137.15					
Mean I.H.P.	25,455				
Number of runs over mile	2				
Mean speed of the two runs	23.544 knots				
Consumption of coal per H.P. per hour	0.796 kilogramme				
" " per square foot of grate and					
per hour	129.756 kilogrammes				
Mean vacuum, in mercurial centimetres	65.5				

During the whole trial the working of the machinery was perfect, the stoking easy, and the engines working silently and with remarkable regularity. There was no perceptible vibration out of the ordinary in the ship, and she steered easily. The conditions required by the contract were:—

Duration of trial	3 hours
I.H.P.	25,000
Consumption of coal per square metre of grate and	
per hour	160 kilogrammes
Mean speed on the mile	23 knots

The ship was constructed by the Société de la Loire at Saint Nazaire, on the plans of M. Bussy, and engines at the works of the same company at St. Denis on the plans of M. Boulogne. The result obtained ($M=3.68$ in the formula $V=M\sqrt[3]{\frac{F}{B^2}}$) shows that the lines of the hull are peculiarly well adapted to ensure a high rate of speed, and this is confirmed by the fact that there was little or no appreciable bow or stern wave. The second-class cruiser "Du Chayla" has lately completed a twenty-four hours' trial at full speed, during which she averaged 18.5; she is supposed to be a 20-knot ship, and doubtless might reach that speed on a spurt under favourable conditions of weather.

The Estimates.—When the Commission of the Budget examined the credits asked for the Navy, the question of new constructions was reserved. Among the new vessels proposed by the Minister of Marine were two battle-ships of 14,865 tons, costing 35 millions of francs (£1,400,000) each. The Commission has since requested the Minister of Marine to apportion the cost of these two vessels for the first year on the other vessels now building. Later on, M. de Lanessan informed the Commission that, while reserving the question of these two battle-ships, he proposed to replace them by two armoured cruisers of 12,400 tons, to be constructed at Brest and Toulon, similar to a third cruiser already figuring on the list, to be constructed at Cherbourg, the cost of each being 28 millions of francs (£1,120,000).

The Commission has now examined this new proposal, and has informed the Minister of Marine that it cannot agree to the construction of these cruisers, as, in view of the exterior political situation, it is of opinion that the money at disposal should be devoted to accelerating the construction of the vessels already commenced. It has, therefore, decided not to vote the credits asked for unless they are applied in this manner, and things appear to have got to a deadlock.

In the meantime, M. Lockroy, ex-Minister of Marine, has introduced in the Chamber an amendment to the Naval Budget, worded as follows:—"That a sum of 500 millions (£20,000,000) is placed at the disposition of the Minister of Marine, to be apportioned as follows:—250 millions (£10,000,000), fleet and torpedo flotilla; 250 millions (£10,000,000), defence of coasts and *points d'appui*."

The 250 millions for the fleet is to be divided in vessels:—Defensive: Torpedo-boats, gun-boats, submarine boats. Offensive: Battle-ships.

According to M. Lockroy, the battle-ships will not be vessels of enormous tonnage and extravagant cost, like those proposed, and which are nevertheless inferior in artillery and speed to similar vessels built by England.

The question of the armament and defence of *points d'appui* abroad, or, as we should say, coaling stations, is evidently, from the various notices in the French papers, about to receive serious attention, notice having been particularly drawn to the importance of the subject by the object-lesson afforded during the recent Spanish-American war, when Spanish vessels proceeding to the relief of the Philippines were refused coal at Port Said, unless for the purpose of returning to Spain, and were therefore unable to proceed.

New Regulations.—A further circular regarding admission to the École Supérieure de la Marine has been issued, in which the chief points are:—Admission is without competition, on application of the candidate at the time of the general inspection, lieutenants having at least three years' sea time.

The Minister fixes each year the number of candidates to be admitted.

On leaving the École the officers' names are to be placed by seniority on a separate list for employment as aides de camp to flag officers, or for embarkation by choice on vessels of over 5,000 tons, or for posts on the general staff of the Navy in Paris. Officers' names only remain on this special list for two years.

A new decree has been published regarding the promotion of officers in the Navy. The commission of selection will be as formerly, their powers not being interfered with, but the Minister of Marine is to have the right of nominating one-fifth of the names on the list.

It is stated that Rear-Admiral Caillard, Chief of the Staff of the Navy, did not approve of the new regulations for promotion, giving greater power of selection to the Ministry, and that he wished to resign. At the earnest desire, however, of the Minister of Marine he will remain at his post.

The "Goubet."—The submarine boat "Goubet" has been under trial at Toulon as regards her habitability, stability, and water-tightness, with good results. For her preliminary trial under way she was nearly submerged, only the

dome appearing above water for a height of 25 centimetres (9·8 inches). There was a considerable swell, and the speed obtained was about 5 knots. She was escorted by a steam launch, and on arriving near Fort Eguillette she dived twice, proceeding under water for 50 or 60 metres (56 to 65 yards). She then remained submerged for 20 minutes following the movements of the steam launch that accompanied her by means of an optical tube. On her return to harbour she proceeded at 6 knots, passing under the numerous chains and cables which moor the vessels in the arsenal without accident. The trials are to be continued at sea.—*Le Temps* and *Le Yacht*.

RUSSIA.—The following are the principal appointments which have been made: Vice-Admirals—Kaznakov a member of the Admiralty Council; Makarov to be Commander-in-Chief and Military Governor at Kronstadt; Dubasov to be Senior Flag Officer. First Fleet Division:—Captains—Yenish to command 14th Fleet Equipage and first-class cruiser "Aurora"; Cherkass to command battle-ship "Pobieda"; Virenus from "Pobieda" to battle-ship "Oryel."

New Ships.—The trials of the engines of the first-class battle-ship "Peresviet" gave as the result of eight series of diagrams the following:—Highest pressure cylinder, 1,405·15-H.P.; medium, 1,527·37-H.P.; lowest, 1,633·69—total, 4,566·21; or for the three engines, with an average pressure of steam to the square inch of 169·5 lbs., a result of 14,532-H.P., or some 32 more than the contract.

She and her sister ships the "Osliabia" and "Pobieda" are considered in Russia a happy combination of battle-ship and cruiser, having the protection of vital parts and armament, the numerous guns and solidity of the one with the speed, range of action and seaworthiness of the latter. She has some new features as Russian ships go, her three distinct engines, each with a separate screw, her 6-inch guns are each in a casemate with 2 to 5 inches of armour, and electricity is used to a hitherto unknown extent, and her six dynamos give 6,000 ampères at 100 volts. She can be steered by hand, the steam transmission engine with cylindrical or electricity, besides Paidâsi's hydraulic and Shubin's electrical modes of transmission, or five different methods in all. Her engines are well protected by an armoured deck, and have very small hatches.

An official trial of the engines of the first-class battle-ship "Sevastopol," 10,200 tons, in the presence of a commission, presided over by Rear-Admiral Amosov, at full power and lasting six hours, was carried out on the measured mile at Kronstadt. They were very satisfactory. The estimate was that both engines on an average should develop 10,600-H.P. at 95 revolutions of each screw and 150 lbs. pressure of steam. The expenditure of coal was 2 lbs. per hour per H.P.

The second-class cruiser "Diana," launched in October, has an ordinary coal supply of 907 tons, and an extreme capacity of 1,430 tons. With the former she can steam 1,780 miles at 20 knots, or 3,648 at 10 knots, and with the latter can cover 2,688 miles at 20 knots and 5,606 at 10 knots. Her screws are three-bladed, with a diameter of about 13 feet 5 inches, and the Belleville boilers, of the 1894 model, have a heating area of 36,114 square feet, and will be subjected to a test of pressure at 360 lbs. to the square inch. They are divided into 3 groups of 8 boilers each. Her deck armour is 1½ inches thick amidships, and 2½ towards the sides, the total number of plates being 240, and is roughly composed as follows:—

Nickel	...	...	...	...	8	per cent.
Carbon	...	...	...	...	·09	"
Phosphorus	...	...	...	...	·03	"
Silica	...	...	...	...	·05	"
Sulphur	...	...	...	...	·05	"
Manganese	...	...	...	...	·4	"

The funnels are protected by 1½-inch armour. She belongs to the class of protected cruisers which were long looked on with great disfavour in Russia, but are

now fast growing in estimation, owing to the discovery of a special kind of maize plugs for stopping shot holes. She has had five predecessors in the Russian Navy, the first of which, a 32-gun frigate, took part in the battle of Rolhensahn, 1789, and the fourth, a 52-gun ship, formed part of Count Pontiatine's little squadron in 1853-54, sent to open up communication with Japan, in which the commander was partly successful. She was so damaged in the earthquake of 23rd December, 1854, that on being towed from Simoda (Japan) to Port Arari she sank, her crew having to proceed in the schooner "Heda."

The building of the first-class battle-ship "Kniaz Potemkin Tavricheski," 12,582 tons displacement, is being pushed rapidly forward. Her engines are 10,600-H.P., and her estimated speed 17 knots. She is to have four broadside under-water torpedo-tubes, and one in the bows. There are to be 8 turbines with an ejecting capacity of 500 tons per hour, 3 Friedmann No. 10 ejectors, and 6 pumps, four on the Stone system. All her auxiliary engines will be worked by electricity, for which purpose 4 large dynamos are being constructed by Siemens and Halske. The first plate of her keel was laid on the 15th July, 1897, but no further work was done on her until 15th December of that year. She is to be launched, it is hoped, next May, or in case of inevitable postponement, in August. Some 700 men are now employed on her daily.

The first-class battle-ship "Cesarevich," under construction at the Forges et Chantiers de la Méditerranée, is to have a speed of 18 knots, subject to a 12 hours' trial. Special care has been taken to make the space between the two armoured decks absolutely water-tight, so that in case of damage to the lower part of the hull the water shall not be able to spread into this space. A splinter shield, of French pattern, is to be fitted under the forecastle.

The "Smolensk," which is building in England for the Volunteer Fleet, will be some 60 feet longer than the "Moskva," and have four principal engines, working independently of each other. She is to have refrigerators of a new pattern.

Torpedo-boats and Destroyers.—Ten torpedo-boat destroyers of the "Sokol" type have been ordered of the Neva Works, though improvements have been introduced. These boats will be of 350 tons displacement, having a length of 210 feet, 21 feet beam, a draught without keel of 5 feet 10 inches, and a minimum speed of 26 knots. They will be built of sheet steel, and have three ejecting torpedo-tubes, one 75-millimetre quick-firer and five 45 millimetres each. Two engines of triple expansion, and with three cylinders, acting on twin screws, will be supplied, with steam from four Yarrow boilers at 250 lbs. pressure. These will have a grate area of 12,825 feet, or 2½ feet to each I.H.P. The first of them is to be ready by June, 1900, and the rest not later than 1st May, 1900, subject to fines for late delivery and failure to attain the required speed, and they are to cost 493,340 roubles apiece.

Two torpedo-boats, the "Krechet" and the "Korshun," have been delivered by Messrs. Creighton & Co.; they have a displacement of 240 tons each. Their boilers of the Yarrow system were intended to be heated with naphtha, but owing to the bad results this was abandoned in favour of coal, and they then came without a convoy.

The trials of torpedo-boat No. 114, built on the "Anakria" type, gave a mean speed of 16 knots, with an expenditure of naphtha of 15 cwt., or about 23 lbs. per H.P. per hour. There was complete combustion, almost unaccompanied by smoke. It is hoped by Engineer-Mechanic Shchensnovich that he will obtain equally good results with water-tube boilers and artificial pulverisation on board torpedo-boat No. 129, built at the Ijora Works, on the type of the "Pernov."

General.—The new coast-defence ironclad "General-Admiral Apraxine" ran on a rock outside Kronstadt, and it seems possible she may become a total wreck. Attempts to destroy the rock, which has pierced her inner bottom in two or three places, by dynamite, have had to be given up, the risk of still further injuring the

ship's bottom being too great. Divers have also been sent, under Lieutenant von Schultz, from the Kronstadt Diving School, but could effect nothing. Various attempts were made also with pneumatic apparatus to tinker her up under water, and then raise her, as was done with the "Reina Mercedes"; but the coldness of the weather has made this exceedingly difficult, as the diver has either to wear so much clothing that he cannot use the apparatus, or else get quite numb.

The first-class cruiser "Kniaz Pojarski," besides alterations to her double bottom, will have her machine and boiler foundations repaired, at an approximate cost of 40,000 roubles.

The steam Belleville boilers, ordered of the Franco-Russian Company for the battle-ship "Imperator Nikolai I.," are now ready, and arrangements are being made to have them and the machinery ready for trial by April 1st of next year, as by the 1st May she should be ready to join the Gunnery Training Squadron.

It is said that the damage to the "Ermack" was due to her having to encounter ice and floes of quite exceptional thickness. In some places the ice reached 25 feet and upwards, and that of a resisting power far greater than the ice of rivers. An eye-witness declares she must have been thoroughly sound in construction, or she would not have come off so cheaply. It appears that Admiral Makarov refused to go into the Stur-fiord, because his pilot warned him that a vessel of such deep draught would be in great danger from the number of sunken rocks.

The Academy of Science has been presented by the ship's company of the "Bakan," which formed part of the Spitzbergen expedition, with an exceptionally fine skeleton of the seal *Phoca barbata*. The animal was killed by the crew during the expedition of this summer at Griganburg in the Aisfiord, Spitzbergen.

Some trials carried out at the Carnegie Works in America of armour plates, ordered by the Russian Government, were made with 5-inch projectiles. These had a velocity of upwards of 2,000 feet per second, and their greatest penetration was $2\frac{1}{2}$ inches, and no cracks. The happy combination of high temper and viscosity of these plates enables them to offer a resistance 50 per cent. greater than those prepared by the Harveyized method. The Government stipulated only for 38 per cent. more than the Harveyized plates.

We are told that the Russian Naval Section at the Paris Universal Exhibition is to be decorated in a noticeable way. The entrance will be flanked by two lighthouses, surmounted by globes, with a map on them of the Russian dominions, and lit by electricity. Between the pillars will be an arch formed of oars and boat-hooks laid fanwise in the upper part, and an arrangement of national flags in the lower. The interior ornamentation of the pavilion will be exclusively formed of objects used in the naval service.

Harbour Works.—The Port of Libau is now fast coming into use as a dockyard. Its new designation is Port Alexander III. In dry dock No. 1, ten torpedo-boats are on the stocks. Its length is 600 feet; width of entrance, 85 feet; depth at entrance, 30 feet. The door can be rolled on one side on rails, in from 10 to 14 minutes. No. 2 is not yet complete, but it is proposed to finish it this spring. Most of the work-shops also are now complete. Two turbine engines and four boilers are at work near dock No. 1. As usual, these were made and set up by Englishmen. Dredgers are at work keeping the channel at a depth of 30 feet.

Two ice-cutting tugs have been ordered at Helsingfors for the Port of Kronstadt. Their dimensions are:—Length, 80 feet; beam, $17\frac{1}{2}$ feet; draught, 7 feet 4 inches; and they have 4 water-tight bulkheads, the bow and stern compartments being intended for water ballast. They are to cost 90,000 roubles, and are to be ready by 1st May. Their engines are to be not less than 200-H.P., and their boilers cylindrical, with a backward flow of smoke. Their steam centrifugal

pumps have a capacity of 300 tons in the hour, and are for fire-extinguishing and salvage purposes. All their Kingstons, in case of use in getting rid of ice, are fitted for heating by steam.

It is proposed this year to proceed with the improvement of the Port of Poti, which has two grave defects—want of depth and want of wharf frontage. At present only three sea-going ships can lie alongside at a time. The mole is very narrow, and a ship lying further in can only be loaded to a draught of 21½ feet, whereas large ships drawing 24 feet often arrive. Some 333,000 tons of goods pass through the port in the year. Moreover, when the wind is blowing from the sea the anchorage is unquiet and even dangerous. As Batum may be turned into a military port, it is felt to be time that Poti was attended to. The scheme for altering the external arrangements of the port has been already approved by the engineering council of the Ministry of Means of Communication.

Another harbour which is to be enlarged is the Greater Roadstead at Kronstadt. The average depth of the roadstead at ordinary tide for two miles from the turning posts is 28 feet, and in order to deepen a strip of 100 toises in this direction to, say, 31 feet, mud to the amount of 75,000 cubic fathoms will have to be removed. The work could be done in favourable weather in 14 days, as one dredger could remove 300 cubic fathoms in an hour.

Since 1896 some twenty important points on the sea-shore, such as light-houses, have been connected by telegraph and telephone with the main system of the Empire and its administrative and commercial centres. In many instances this has had to be done by submarine cables. Along the Baltic coast some 240 miles of telegraph have been constructed, 20 miles being submarine cable. One of the most important parts is the connection of the Island of Hogland with the shore near Cape Kund, for which a cable 40 miles in length is needed. This has been ordered of the firm of Siemens and Halske, and will be laid when navigation is opened this year, and the work will probably be completed by June of this year.

It is proposed to unite the Baltic and Black Seas by a ship canal. The idea is to join the Gulf of Riga, and the Rivers Dvina, Berezina, and Dnieper, with the Black Sea near Kherson by a series of canals, the length of which would be some 1,005 miles, and the depth 28 feet, and the estimated cost 500,000,000 francs. The Port of Libau on the north and that of Nicolaiev on the south might be further served by this same canal. The most difficult part would be the upper waters of the Dnieper, where the country is wooded and marshy. The chief obstacle, however, is the money.

Instructional.—It is proposed for the future to send the students of the Constructors' Branch of the Engineer College to sea with those of the Mechanical Branch. The juniors will go in the training-ship "Strielok," and the seniors in torpedo-boats. This is looked on as a very useful innovation. The scale of pay of constructors is to be raised, and the chief engineer at St. Petersburg is to have 4,000 roubles a year. The junior assistants are to have 100 roubles a month. This is introduced tentatively at St. Petersburg, and if attended by good results during the year it will be extended to other ports, and the engineers will receive a year's arrears of the increased pay.

For the future the Naval Engineer College will only accept students who have a certificate from some intermediate educational establishment. Hitherto some twenty have entered every year without such a certificate, and have had to be got rid of, after bringing nothing but discredit on the college. They are generally crammed up, and thus forget what they have hurriedly learnt merely for examination purposes.

It is curious to learn, in connection with the temporary commissioning of the "Admiral Ushakov" for the training of masters in the mercantile marine for six

weeks in the special work of the Navy, that a large number of them are very difficult to teach because many of them know no Russian. Many of them are preparing for examination as sub-lieutenants of the Naval Reserve.

STATIONS OF SHIPS.

PACIFIC OCEAN

Port Arthur.

Battle-ships—"Navarin," "Sissoi Velikie."

First-class cruisers—"Rossia," "Rurik," "Pamiat Azova," "Dimitri Donskoi."

Gun-vessels—"Mandjour," "Otvajny," "Gremiastchy."

Torpedo-cruiser—"Vsadnik."

Vladivostok.

Second-class cruiser—"Zabiaka."

Nagasaki.

First-class cruiser—"Admiral Kornilov."

Second-class cruiser—"Rasboinik."

Gun-vessels—"Sivoutch."

Mozanpo.

First-class cruiser—"Vladimir Monomakh."

Torpedo-cruiser—"Haidamak."

Fusan.

Gun-vessel—"Bohr."

Chemulpo.

Gun-vessel—"Korietz."

MEDITERRANEAN.

Saloniki.

Battle-ships—"Imperator Alexander II."

Smyrna.

Gun-vessels—"Giliak," "Zaporojets."

Torpedo-cruiser—"Abrek."

Piræus.

Battle-ship—"Petropavlovsk."

Torpedo-boat—No. 120.

Toulon.

Gun-vessel—"Khrabry."

Samos.

Torpedo-boat—No. 119.

First-class cruiser—"Herzog Edinburgski."

Tenerife.

Second-class cruiser—"Djigit."

UNITED STATES.—*The Nicaragua Canal.*—The earnest discussion of the Nicaragua Canal project in Congress, and the great interest of the public in the subject, has led several well-known and able officers of both Services to write upon it. Two of the most prominent are Brigadier-General H. L. Abbot, U.S. Army, retired, who is a member of the Panama Canal International Technical Commission, and Captain A. S. Crowninshield, U.S. Navy. The Panama Canal Company publishes an illustrated pamphlet, giving the history and present condition of and plans for the work. These papers enable us to compare the two projects very closely.

The first thing to be noted is that the Panama route has the shortest line to be found between the two seas, 46.2 miles, as against 169.4 miles on the Nicaragua line. On the other hand, the Nicaragua route occupies the lowest divide to be found anywhere between the two oceans, its greatest height being only 150 feet above sea level, while the Culebra on the Panama line is 290 feet in elevation, which will require a cut 220 feet deep, to establish the 69-foot level which will be the highest stretch of the canal.

The second point is that the Panama Company has abandoned absolutely the one great characteristic upon which De Lesseps insisted so strongly, the sea level waterway. Even his merciless extravagance recoiled from a rock cut 320 feet deep. The present plans contemplate a work in six levels with five dams on the line of the canal and one on the upper Chagres to control that difficult stream. The number of levels in the Nicaragua line has not been determined, but probably will not exceed this. The two enterprises are practically equal in this respect. Each has two great dams to be constructed, for it is significant that the French engineers have abandoned the distinctive features of their first plans and have adopted measures which resemble very closely those by which American engineers always proposed to surmount the ocean divide. The Panama line has stupendous cuttings which cannot fail to send large quantities of wash into the canal. The Nicaragua line has immense embankments to offset its rival's cuttings.

The Panama Canal will flood the Chagres River by a dam at Bohio, 1,286 feet long, 75½ feet above the river, and 93½ feet above foundations. The impounding dam at Alhuela, on the upper Chagres, will be more formidable even than this. It will be 936½ feet long, 134½ feet above the river, and 164 feet above foundations. From this point a feeder 10 miles long over rough country will supply the summit level. The exact size and position of the dam which will be necessary to control the San Juan River on the Nicaragua line have not been settled, but it will be comparable to that at Bohio, and besides there are not such formidable embankments to be made. The Panama route certainly has no advantages in this respect.

In fact, the engineering aspects of the two lines are in favour of the northern route. The San Juan River is the mildest lamb in comparison with the raging Chagres, which has been known to pour out a flood of 150,000 cubic feet per second. To meet its extraordinary changes of volume a slack water level is planned to reach from Bohio to Obispo, a distance of 13 miles, and covering an area of 21½ square miles. Even on this area a variation of 13 feet in level is expected, the flood water to be retained here being 196,000,000 cubic feet, with 130,000,000 more at Alhuela. The slack water on the San Juan will reach for more than 60 miles, and the floods to be provided for are small in comparison with those of the Chagres. Considered from the standpoint of permanence it can hardly be doubted that the wear and tear will be less at Nicaragua than at Panama. Heavy floods are powerful eroding agents, and in time the accumulations of deposit from the Chagres River will tend to fill up these artificial lakes, and no use of dredgers can keep pace with this natural force. Nature is working all the time to even up the world, and in a century or two the effects of her operations would make a very perceptible difference in the capacity of the Chagres dams.

The Nicaragua line has the great advantage of possessing a large natural lake for its summit level. Lake Nicaragua is a sheet of water 90 miles long, and 40 miles wide, and though it drains a country of 3,000 square miles in extent, it has been doing this for thousands of years. It can continue to receive this drainage probably for thousands of years more without destroying its value as a receiving basin. In permanence it is far beyond any of the artificial substitutes to which its rival must resort. From the lake the drainage is downward, and whatever comes out of it is clear water that will not fill up the canal.

Though the Panama route is the shortest, it requires the greatest length of excavation, for on the Nicaragua line there will not be more than 26·8 miles of cutting, and the Panama cannot get on with less than 30 miles, besides 3½ miles of dredging in the harbour, and 13 miles of slack water. With all the money that has been spent on the Panama Canal by the old company, amounting to no less than \$156,400,000 on the Isthmus and about \$103,600,000 in Paris and elsewhere, the cost of what is still to be done is put at no less than \$102,400,000, and this after the old company had expended \$88,600,000 in actual excavation, etc., and the new company some millions more. The Nicaragua Canal is expected to cost \$125,000,000 to \$135,000,000, and as the Panama estimates will rise to \$125,000,000 if the locks are increased to a width of 82 feet, it is evident that the whole cost of the new work is but little more than the sum needed to complete the old.

The question of cost is one in which commerce has an abiding and particular interest. The Panama Company, with its \$260,000,000 of old obligations, its \$100,000,000 of projected expenditure, and whatever sum the new company has spent already, will have a huge total of obligations, reaching even to \$400,000,000, on which profits must be earned. Why should the commerce of the two oceans be loaded for ever with the rogueries of De Lesseps' companions? If we can put through a canal for \$150,000,000, the difference in its earning requirements will be an important saving to commerce, enough, perhaps, to put a dozen great steamships on the ocean every year, or to lessen tolls to such a point that American commerce and products will derive the greatest benefits by the reduction of freight. Such advantages ought to outweigh in American eyes any considerations which have been presented in favour of the French undertaking.

It is the propensity of engineers, as of other men, to become somewhat blind even to manifest difficulties in the prosecution of enterprises in which they are interested deeply. This is the spirit that pushes great works to completion, but we think General Abbot carries it rather far when he adopts the view of the French surgeon in charge of the hospital near Panama that the climate of the Isthmus has no dangers for white men! The Panama railroad was built at the cost of such mortality that it was said a labourer was laid to rest for every tie under the track. The actual history of the canal does not support Dr. Lacroisade's view. But all accounts show that Nicaragua is more healthy than Panama, and if the French physician is correct, a proper selection of labourers and due care of their health will relieve work on the new undertaking from one of its greatest terrors.

General Abbot remarks that an engineer has nothing to do with those questions of public policy that have so much effect upon Congressmen and non-official Americans, but that is simply a confession that the ultimate decision ought not to be left to the engineer, for these questions are of the first importance. It is with them that Captain Crowninshield concerns himself principally, and he makes a powerful argument. It is not quite correct for General Abbot to say that the Panama Railroad "is now controlled by an American company." The corporation is American, but its owners are Frenchmen, and there is great importance in the fact. We all know the story of the man who built a house in New York, importing everything but the cellar. That had to be dug in America. So it is with the canal. It is American in location and ought to be American in ownership and control.

With the improvements in machinery which we owe to the intelligence that directed the excavation of the Chicago drainage canal, there is no doubt that the difficulties presented by the Nicaragua route can be overcome with the least possible expenditure of money, and we can have a water route that will satisfy in cost, convenience, and permanence the just requirements of American commerce and national feeling. Its value to commerce is shown by the eagerness of the French to control it.

Growth of American Shipbuilding Yards.—When, in 1888, the American Government called for tenders for its pioneer torpedo-boat the "Cushing," only

one firm felt competent to bid for the 22-knot craft. The Herreshoffs got the order, and at the last moment felt compelled to ask permission to substitute an English boiler, the Thornycroft, and with it the boat was accordingly fitted. Last month (says the *Shipping World*) the American naval authorities received bids from fifteen firms for the construction of the 28 destroyers and boats to form part of their latest group of torpedo craft, and as the names of several large firms are absent from the list, it may safely be said that there are no fewer than 20 yards in the Union from which the United States could draw its supplies of these and similar vessels. As with war-vessels, so it is with its merchant tonnage; the yards capable of rehabilitating the American mercantile marine have increased amazingly both in capacity and numbers during the past few years.

Coaling Ships at Sea.—The novel experiment of coaling a war-ship at sea has just taken place off Sandy Hook. This was done by means of a cable and trolley wire strung between the battle-ship "Massachusetts" and the collier "Marcellus." Bags of coal were slid along the cable rapidly from the collier to the war-ship, over a distance of 300 feet. There was a moderate sea on at the time, but so well arranged was the pulley and trolley apparatus that everything worked smoothly, and fifteen tons of coal were transferred in forty minutes. There are six sets of plans now before the Bureau of Equipment at the Navy Department, Washington, for the loading or coaling of vessels at sea. The difficulties encountered by the American fleet during the blockades and operations before Santiago, San Juan, and Manila made more obvious than ever the necessity of some means to coal naval vessels while on their stations. As a result, at least six inventors have laid their plans before the Government officials at Washington.

Among these inventors is John E. Walsh, of Brooklyn, whose method was tried off Sandy Hook. Mr. Walsh has spent a lifetime in loading and discharging ships, and it is conceded that his experience in that direction entitles his opinions to every respect. As a result he was invited to lay his plans before the President and Council of a Society of Naval Architects and Marine Engineers at the annual meeting of that body.

The great difficulty to be encountered in coaling a vessel, or loading her at sea, arises from the pitching or rolling, or both, of the vessels. Their relative positions, in a seaway, are constantly changing, and the consequent difficulties must be met by some contrivance that will be ever ready to meet these altered conditions.

Acting on this theory, Mr. Walsh has devised a system of sliding weights, or counterpoises, which he believes solves the cardinal difficulties of the problem. The vessel to be coaled takes her collier in tow at any convenient and reasonable distance, 100, 300, or 500 feet. From the bitts, or ring bolts, or guns or mast of the former, to the head of the collier's foremast, or to a point on the topmast, two wire guys are stretched, passing through blocks on cross-trees on the collier's mast. These are run through single blocks and then through two four-sheave pulley blocks, the inboard ends being then led respectively over the drums of two hoisting engines abaft the mast. Attached to each of these lower blocks is a counterpoise, which may be increased or diminished in weight as the circumstances warrant.

With this purchase, 8 feet of rise or fall, or variation, of the vessel to be coaled, will give a fall or rise of 1 foot to the counterpoises. These latter slide up and down each side of the mast on guides, to which they are attached by collars, that give free play to their vertical movement. The guides are of wire cable, with turnbuckles. Beneath each weight is a strong spring cushion, arranged to take up sudden shocks from the weights that might otherwise injure the decks. If the vessel has three or more masts, the counterpoises are attached to the mainmast. The guys carry the coal buckets to and from the vessel to be coaled, these buckets being hooked on to the trolleys that run on these guys.

The loaded buckets are carried to the war-ship by gravity, and, after being discharged, are hauled in again by winches on the collier with four-foot drums.

Each of the collier's masts is filled with two horizontal fore and aft booms rigged near the lower masthead. These are fitted with slots, in which trolleys run. Sliding weights on the respective masts keep these trolleys always drawing towards the outer ends of the booms. The trolleys carry the buckets to and from a platform beneath the guy lines, but they can be stopped at any point over the hatches by means of breaks.

Around the foremast, but above the deck, is built a square platform on which one or two men stand. When a loaded bucket comes from below, a derrick picks it from the trolley and an attendant hooks it on to the guy trolley, from which the empty bucket has been released, and sends the loaded one on its way to the war-ship. The empty bucket is picked up, placed on the overhead boom trolleys and sent to the hatch where the coaling is being done.

Plans have also been perfected for the coaling or loading of two vessels lying parallel, but apart from each other, and this plan is said to have attracted even more attention at the Navy Department than the fore and aft method. —*Army and Navy Journal*.

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS FOR DECEMBER, 1899.

Colonel J. F. Hilton, from h.p. to be Colonel to command the 23rd Regimental District (Royal Welsh Fusiliers). Colonel C. E. Knox, from 32nd Regimental District, to be a Major-General on the Staff to command an Infantry Brigade at Aldershot with the temporary rank of Major-General whilst so employed. Brevet Colonel R. A. P. Clements, D.S.O., A.D.C., from Lieut.-Colonel the South Wales Borderers, to be a Major-General on the Staff to command an Infantry Brigade at Aldershot, with the temporary rank of Major-General whilst so employed, and to have the substantive rank of Colonel in the Army. Colonel (temp. Brigadier-General) J. W. Murray, from a Colonel on the Staff to be a Brigadier-General on the Staff, Lines of Communication in South Africa, and to have the temporary rank of Brigadier-General whilst so employed. Brevet Colonel H. T. S. Yates, from Lieut.-Colonel R.A., to be an A.A.G., and to have the substantive rank of Colonel in the Army. Lieut.-Colonel J. C. F. Gordon, C.I.E., I.S.C., to be Colonel. Brevet Colonel J. W. Thurnburn, from Lieut.-Colonel R.E., is granted the substantive rank of Colonel in the Army. Colonel A. B. Stopford, from h.p. R.A., to be Colonel on the Staff for the R.A., in India, and to have the temporary rank of Brigadier-General whilst so employed. Lieut.-Colonel and Brevet Colonel J. W. B. Parkin, A.S.C., to be an A.A.G. Lieut.-Colonel P. H. Hammond, from R.A., to be Colonel on the Staff, for R.A., and to have the substantive rank of Colonel in the Army. Colonel M. S. Crofton, C.B., D.S.O., to be an A.A.G., during the absence of Colonel A. W. Morris in South Africa. Lieut.-Colonel F. S. Allen, h.p., to be Colonel. General A. G. Montgomery Moore, to be a Lieut.-General on the staff, to command the troops at Aldershot. Colonel C. Kennedy, to be a D.A.G. Surgeon-Major-General A. F. Bradshaw, C.B., and Surgeon-General A. H. Fraser to be Hon. Physicians to the Queen. Colonel W. A. Dunne, C.B., to be A.G.M.G., at Head Quarters.

Field-Marshal the Rt. Hon. Frederick S., Lord Roberts, K.P., G.C.B., G.C.S.I., G.C.I.E., V.C., to be Field-Marshal Commanding-in-Chief the Forces in South Africa. Major-General Horatio Herbert, Lord Kitchener of Khartoum, G.C.B., K.C.M.G., to be a Major-General on the Staff, as Chief of the Staff of the Forces in South Africa. Colonel (temp. Major-General) Sir W. G. Nicholson, K.C.B., to be Military Secretary to Field-Marshal the Rt. Hon. F. S.

Lord Roberts, K.P., G.C.B., G.C.S.I., G.C.I.E., V.C. Colonel W. F. F. Chamberlain, I.S.C., to be first A.D.C. and Private Secretary to Field-Marshal the Rt. Hon. F. S., Lord Roberts, K.P., G.C.B., G.C.S.I., G.C.I.E., V.C. Colonel H. R. Viscount Downe, C.I.E., to be A.D.C. to Field-Marshal the Rt. Hon. F. S., Lord Roberts, K.P., G.C.B., G.C.S.I., G.C.I.E., V.C. Major-General G. T. Pretyma, C.B. Royal Artillery, to be Commandant at Headquarters in South Africa.

The under-mentioned appointments are made to the Staff on mobilisation of the 6th Division :—Major-General (temp. Lieut.-General) T. Kelly-Kenny, C.B., to be Lieut.-General on the Staff to command the Division, with the local rank of Lieut.-General while so employed. Colonel A. E. Goldsmid, to be A.A.G. Lieut.-Colonel W. L. Gubbins, M.B., R.A.M.C., to be P.M.O. Colonel (temp. Major-General) R. A. P. Clements, D.S.O., A.D.C., to be Major-General on the Staff to command the 12th Brigade, with the local rank of Major-General whilst so employed. Colonel (temp. Major-General) C. E. Knox, to be Major-General on the Staff to command the 13th Brigade, with the local rank of Major-General whilst so employed.

The under-mentioned appointments are made to the Staff on mobilisation of the 7th Division :—Major-General C. Tucker, C.B., to be Lieut.-General on the Staff to command the Division, with the local rank of Lieut.-General whilst so employed. Lieut.-Colonel H. E. Belfield from the Duke of Wellington's (West Riding Regiment), to be A.A.G., with the substantive rank of Colonel in the Army. Lieut.-Colonel J. A. Gormley, M.D., R.A.M.C., to be P.M.O. Major-General Sir Herbert C. Chermiside, G.C.M.G., C.B., to be Major-General on the Staff to command the 14th Brigade. Colonel J. E. H. Prior to be Major-General on the Staff to command the 15th Brigade, with the local rank of Major-General whilst so employed.

HOME.—The War Office has issued the following announcement :—

Her Majesty has been pleased to accept the services of twelve Militia battalions for service out of the United Kingdom, in accordance with the provisions of the Reserve Forces and Militia Act of 1898.

Seven battalions will serve in South Africa, and are as follows :—

- 4th Bn. Royal Lancaster Regiment.
- 6th Bn. Royal Warwickshire Regiment.
- 3rd Bn. South Lancashire Regiment.
- 4th Bn. Derbyshire Regiment.
- 9th Bn. King's Royal Rifle Corps.
- 3rd Bn. Durham Light Infantry.
- 4th Bn. Argyll and Sutherland Highlanders.

Two battalions have been accepted for service in Malta—the 3rd Bn. West Kent Regiment and the 3rd Bn. North Lancashire Regiment; two for service in the Channel Islands—the 3rd Bn. Devonshire Regiment and the 3rd Bn. Suffolk Regiment; and one for service at a station not yet decided on—the 6th Bn. Lancashire Fusiliers.

The Secretary of State for War has decided that service with an embodied Militia unit, or with a unit of the Regular Forces, shall count, if not of less than one month's duration, as one annual training; if of four months' duration, as two annual trainings. Attachments under para. 310 (c) Militia Regulations, will not be counted as service for this purpose.

The Royal Warrant for the formation of Corps of Imperial Yeomanry and the official instructions has been promulgated to the Army by the War Office.

The instructions state that the Yeomanry will be organised into battalions of four companies each; each company will consist of 1 major or captain, 4 subalterns, 1 colour-sergeant, 5 sergeants, 1 farrier-sergeant, 3 shoeing smiths, 1 saddler, 2 buglers, 6 corporals, 97 privates—total 121.

The battalion staff is to comprise 1 lieutenant-colonel, 1 adjutant, 1 medical officer, 1 veterinary officer, and 1 acting sergeant-major.

A distinguishing number will be allotted to each company in the order in which it is raised. The selection of the battalion staff will be controlled by the War Office, and the selection of the company officers and composition of each company by the Imperial Yeomanry Committee.

Applications for enlistment should be addressed to officers commanding Yeomanry regiments.

Candidates for enlistment will present themselves at the headquarters of a Yeomanry regiment, or at such other place as they may be directed to for the purpose of being medically examined and attested.

It is sufficient that the candidates should be free from organic disease or other defect likely to prevent him from doing his work during the duration of the present war.

The conditions under which the services of members of the Volunteer forces will be accepted for duty in South Africa are thus stated in an Army Order issued by Lord Wolseley, Commander-in-Chief :—

1. A carefully-selected company of 116 all ranks may be raised for each Line battalion serving in or about to proceed to South Africa from the affiliated Volunteer battalions. This company will be attached for service to the Line battalion in South Africa, and placed under the commanding officer of that battalion.

2. An equal number of waiting companies may be maintained at home.

3. The 5th (Irish) Volunteer Battalion, Liverpool Regiment, will furnish the company for the Royal Irish Regiment, and the 16th Middlesex (London Irish) for the Royal Irish Rifles.

4. The strength of each company will be :—1 captain, 2 subalterns, 1 sergeant-instructor to act as pay sergeant, 4 sergeants, 2 buglers, 5 corporals, 99 privates, and 2 stretcher-bearers—total of 116.

5. The selection of officers and the composition of each company will be controlled by the officer commanding the regimental district in which it is raised.

In the case of Line battalions having several affiliated Volunteer battalions, companies will be formed from about an equal number of men from each battalion, as the officer commanding the regimental district may decide.

No Volunteer battalion will be allowed to contribute less than one complete section.

6. The following will be the qualifications for service :—

- a. Every Volunteer must enlist for 1 year, or for the war. In the event of the war being over in less than 1 year he will have the option of being discharged at once or of completing his 1 year's service.
- b. He must not be less than 20 nor more than 35 years of age.
- c. He must be a first-class shot under Volunteer rules.
- d. He must have been returned as efficient during 1898 and 1899.
- e. He must be of good character.
- f. He must be up to the physical standard of an infantry recruit as laid down in the Recruiting Regulations for the Army. No relaxation of standard will be allowed.
- g. He must be medically fit for active service.
- h. Preference should be given to unmarried men, or widowers without children. Married men should be accepted only in the event of an insufficient number of single men or widowers without children volunteering.

7. When a Volunteer commanding officer has received application from not less than a section of Volunteers, he will so inform the officer commanding the

regimental dépôt to which his battalion is affiliated, who will then, if they are to form part of the service company, have them medically inspected, and if fit for service, attested.

8. After attestation they will join the regimental dépôt until required for embarkation. In the event of there not being sufficient barrack accommodation available they may be billeted.

9. Volunteers accepted for the waiting companies will be attested, and passed to the reserve at once for the unexpired portion of their engagement, or until required for permanent service. During the time they are in the reserve they will receive reserve pay, and they will be liable to carry out the training laid down in the Reserve Forces Act, 1882.

10. General officers commanding will arrange for all Volunteers to receive, after enlistment, as much instruction in musketry, including range practice, as is possible prior to embarkation.

11. Every officer and man must be clothed and equipped under regimental arrangement exactly as those of the Regular battalion which they are to join, except that the numerals on the shoulder-cords will be as laid down in the Volunteer Regulations. For these purposes a special capitation of £9 will be granted to the corps for each Volunteer.

12. Each Volunteer will receive from date of enlistment pay and allowances of his rank as a Regular infantry soldier, rations, and clothing. Should a married man be accepted, his family will be entitled to separation allowance.

13. On completing his period of service he will receive a gratuity of £5, in addition to any gratuity given to the troops at the end of the war.

If discharged in consequence of wounds, injuries, or disability received or contracted while on service, he will be entitled to pension in accordance with the Royal Warrant for Pay, etc., of the Regular Army.

14. On the departure of a company from the United Kingdom the officers and Volunteers composing it will be considered supernumerary to their corps.

15. Service in one of these companies will entitle an officer or Volunteer to be considered efficient for the year, and the corps will receive capitation grant accordingly for each Volunteer actually enlisted.

INDIA.—The annual report on musketry instruction in India for the year 1898-99, prepared by Colonel W. Hill, A.A.G. for Musketry, has just been received in this country. Major-General W. G. Nicholson, A.A.G. in India, in forwarding the report to the Secretary to the Government of India, Military Department, observes that the Commander-in-Chief considers that the results are satisfactory and creditable to all concerned. Colonel Hill states that the results of the year's training of British troops were as follows:—Total number exercised: Cavalry, 5,427; infantry, 45,497. The best shooting regiments were: Cavalry, 18th Hussars; infantry, 2nd Bn. Border Regiment. The percentage of marksmen: Cavalry, 25; infantry, 28. The percentage of third-class shots: Cavalry, 6; infantry, 6. The percentage of non-exercised men: Cavalry, 3; infantry, 6. The conditions of the annual course for 1898-99 (fired under the regulations of 1898) do not admit of any comparison with the results of previous years, but the standard of efficiency is reported to be satisfactory. In the comparison of the percentage of marksmen to that of the third-class shots the figures show a steady improvement in individual shooting, and indicate that very great pains in the musketry training of their men have been taken by company officers. The sectional or collective practices are satisfactory, and show an improvement generally in the efficiency of unit commanders. The results of the training of the native army were as follows:—Total number exercised: Cavalry, 18,757; sappers and miners, 2,522; infantry, 82,614. The best shooting regiment: Cavalry, Deoli Irregular Force, cavalry; infantry, 1st Bombay Grenadiers. The percentage of marksmen: Cavalry, 24;

infantry, 14. The percentage of third-class shots: Cavalry, 10; infantry, 4. The percentage of non-exercised men: Cavalry, 7; infantry, 4. Forty-two cavalry regiments were exercised in the annual course of musketry, and the result shows the following classification: 32 regiments, very good; 10 regiments, good. In the infantry, 116 regiments were exercised, and are classified as follows: 57, very good; 52, good; 5, moderate; 2, bad. Number of recruits trained: Cavalry, 1,830; sappers and miners, 212; infantry, 9,046. The general efficiency in musketry of the native army is quite satisfactory. The very high standard of efficiency in collective firing indicates good fire control and fire discipline. The usual detailed tables and reports are appended.

FRANCE.—As a continuation to his proposal for the rejuvenation of the cadres, the Minister of War has just filed a new scheme for that law, which lays down that officers, up to the rank of colonel inclusive, may on their request, be admitted, after twenty years' service, to a position called "provisional retirement," in which they are obliged to remain until they have completed a period of thirty-five years' service.

They may be provided with the employment of their rank, or of a superior rank, in the Reserve or in the Territorial Army, and can only be recalled to the active list in case of mobilisation, or for periods of instruction, the duration of which is fixed as four weeks every two years.

At present the right to pension at the lower rate can only be acquired after thirty years of effective service. Each year's service in excess of thirty years and each year's field service adds to the pension one-twentieth of the difference between the lower and the higher rate, which latter is only obtainable after fifty years' service, including field service. As an exception, an officer placed on the unemployed list on account of temporary sickness, and who is known to be unfit for return to the active list, has a right to the lower pension after twenty-five years' service.

The proportional pension of an officer provisionally retired, is calculated in the scheme at one-thirtieth of the lower pension of his rank, or of the rank just below him, for each year of his service, and by adding for every year's field service one-twentieth of the difference between the lower and the higher pension, which latter may never be exceeded.

The proportional pension is replaced by the regular retiring pension after the expiration of the thirty-fifth year of service without any modification of the rate. War services alone can increase this according to the rules mentioned above. The total number of officers admitted to provisional retirement will, at most, be 2,000, and the number of annual admissions will never exceed 100, as long as the 2,000 maximum is not reached. Afterwards the number of admissions will equal the number of vacancies.

The law on proportional pensions, according to the preamble, will allow for the strengthening of the cadres of the reserve units (already greatly weakened by the formation of the 4th Active Battalions) and of the Territorial Army, by drafting into it a certain number of still young and capable officers who have obtained ample experience in the exercise of their duties in the Active Army. The retired officers who, under present conditions, must remain for five years at the disposal of the Government, do not furnish a sufficient supply, and a great number of them with the best will in the world are not in a fit state to enter upon a campaign.—*Bulletin de la Presse et de la Bibliographie Militaires.*

GERMANY.—At the New Year's parade of the troops at the Ordnance House, the Emperor delivered the following interesting address to the officers of the Berlin garrison:—

"The first day of the new century sees our Army, in other words, our people, in arms, gathered around their standards, kneeling before the Lord of Hosts.

And verily, if anyone has especial reason this day for bowing down before God, it is our Army. A glance at our standards suffices as an explanation, for they are the embodiment of our history. In what condition did the past century at its dawn find our Army? The glorious Army of Frederic the Great had slept on its laurels. Fossilised amid all the petty detail of pipeclay, led by superannuated and inefficient generals, with its officers unaccustomed to useful work, lost in debauch, luxury, and foolish arrogance, our Army, in a word, was not equal to its mission, which, indeed, it had forgotten. Heavy was the chastisement of Heaven which overtook it, and which fell on our people. It was cast into the dust. The glory of Frederic was extinguished, and our standards were broken. In many long years of bitter servitude, God taught our people to look to itself, and under the pressure of the foot of a proud conqueror our people engendered in itself that most sublime thought that it is the highest honour to dedicate one's blood and purse to the Fatherland in her armed service—universal military service. Form and life were given to it by my great-grandfather, and new laurels crowned the newly-created Army and its youthful banners. But universal military service only attained its true significance through our great departed Emperor. In quiet work he evolved the re-organisation of our Army, despite the opposition offered by ignorance. Glorious campaigns crowned his work in a way which had never been expected. His spirit filled the ranks of his Army, even as his own trust in God bore his troops on to astonishing victories. With this, his own creation, he brought the German races together, and gave us back the long-desired German unity. It is to him our thanks are due that by the help of that Army the German Empire, commanding respect, has again assumed the position assigned to it in the council of nations. It is for you, gentlemen, to preserve and to employ in the new century the old qualities by which our forefathers made the Army great, namely, simplicity and modesty in daily life, unconditional devotion to the Royal service, and to the employment of one's whole strength of body and mind in the ceaseless work of training and developing our troops. And, even as my grandfather laboured for his Army, so will I in like manner and unerringly carry on and carry through the work of re-organising my Navy, in order that it may be justified in standing by the side of my land forces, and that by it the German Empire abroad may also be in a position to win a place which it has not yet attained. With the two united I hope to be enabled, with firm trust in the guidance of God, to prove the truth of the dictum of Frederic William I.: 'When one of this world wants to decide something, the pen will not do it, unless it is supported by the strength of the sword.'

A special edition of the *Armee-Verordnungsblatt* was published on New Year's Day containing an Order issued by the Emperor to the Army, in which his Majesty, after reviewing the principal historic events of the nineteenth century, announced that, in accordance with the unanimous decision of the German Sovereigns, a commemorative badge had been introduced for the colours of the whole German Army as a fresh pledge of its unity and indissolubility.

The provisions of the Budget for the land forces for 1900 amount to 630,946,998 marks, and mean an increase of 21,496,449 marks to the ordinary budget. In order to provide for the proper carrying out of the five years' law, the Prussian effective will have the following new organisation, viz., 3 squadrons of mounted orderlies, 19 field batteries, a third instruction group (*Abtheilung*) for the Field Artillery School, and an increase of 33 men to the effective of the 14th Military Train Battalion, who will take charge of the horses meant to carry the ammunition of the 4 Jäger battalions.

Independently of the increase to the Army, the appointment of 35 *Oberkriegsgeräthe* (members of the Council for War) has been provided for (in consequence

of the suppression of the military auditors), whose emoluments vary from 4,800 to 6,000 marks, and also the formation of 184 secretarial *employés* and orderlies to the Council for War. Commandants will be nominated for the camps of instruction at Hammerstein, Lamsdorf, and Posen.

The sum of 860,000 marks has also been provided to pay the re-engagement bounties for troops of the dismounted branches, who voluntarily re-engage to serve for a third year with the colours.

The Extraordinary War Budget consists of 214,484,807 marks. It may be mentioned that an increase from 10 to 20 million marks to the extraordinary expenditure is necessitated by the various buildings, such as barracks, clothing, stores, etc., to be constructed in fortified places.

Finally, a sum of 1,900,000 marks has been provided for the purchase of the ground necessary for the formation of a camp of instruction for the 15th Army Corps in Alsace-Lorraine. The effective budget of the military *personnel* provides for 1,195 officers, 153 doctors, and 28,201 men. These figures show an increase of 77 officers, 11 doctors, and 1,552 men from the last budget.

Only one motor-car, with a benzine motor, was used at the manœuvres of 1898, which was placed at the disposal of the commissariat to assist in the transport of provisions. In 1899, however, eight motor-cars were used, as a tentative measure, for the transmission of orders and information—two were for the supervision of connecting posts, and six were placed at the disposal of the different staffs. These motor-cars, built in the works at Aix-la-Chapelle, were worked by pioneers, and some time before the manœuvres two officers of this corps were sent to that town to learn to drive them. The automobiles sent to the manœuvres were of various models, tricycles for two or three persons, with pneumatic tyres, and quadricycles to carry four persons, with space sufficient to hold heavy baggage. Officers and orderlies were frequently met in the theatre of operations, mounted on automobiles, covering long distances in very little time, transmitting orders and information. Thus Captain Öschmann left Carlsruhe with two automobiles on a dark night, covered 85 kilometres in order to distribute instructions at Pforzheim, Leonberg, Weilderstadt, Münchingen, Ditzingen, and other places, for the entraining of the various units at the conclusion of the manœuvres. One of the automobiles, it is true, collided with a large stone, was upset, and was unable to continue its journey; but all its freight was transferred to the other machine. The directorship of the manœuvres exercised a rigid supervision over the automobiles, keeping itself informed as to the services they performed, the distances covered, and the time taken in covering them. The distance between Carlsruhe and Leonberg (70 kilometres) was generally covered in from two and a half to three hours. It was only at steep slopes that the motor cars encountered any difficulty. Sandy and bad roads were naturally unfavourable to them. According to the German papers the results obtained from them were most satisfactory.

In conclusion, it may be mentioned, that an automobile bicycle was also experimented on during the manœuvres. It was ridden by a first-rate cyclist, and in spite of the bad weather and the bad state of the roads, it rendered very great services, and covered the distance from Augsburg to Carlsruhe (about 240 kilometres, in three days.—*Revue du Cercle Militaire*.

THE NETHERLANDS.—The two schemes of the law regarding military obligations and the composition of the Army have just been filed at the second Chamber of the States General. The principal changes laid down in them, and which will be made the object of a thorough investigation when the schemes have been voted by Parliament, may be summed up as follows:—The number of the annual contingent is increased from 11,000 to 17,500 men, of whom 12,300 are compelled to serve for from 12 to 15 months, and 5,200 for four months.

The length of service may always be reduced by Royal decree, and in his statement the Minister of War announced that he would have recourse to this measure in order to definitely adapt, to unmounted troops, a service of eight months which has been in force, as a tentative measure, since the 1st March, 1898.

Militiamen of four months' service (Second Category) will serve in place of the soldiers of the remaining portion of that class, who have been retained with the colours after the departure of the men going on furlough. In war-time they will form a reserve to complete establishments.

Volunteers, taken exclusively from the labouring classes, may be accepted in defalcation of the contingent of the Second Category. These men must give up all benefit that may result from the drawing of lots, but, on the other hand, they are only obliged to serve for four months and the periodical drills, for which they are called up, take place, as far as possible, during the winter, after the departure of the class.

Militiamen belonging to the unmounted branches are called out for periodical trainings for twelve weeks, spread over three years at most; those of the mounted branches are only called out once for six weeks.

The total period of military obligation is fixed at fifteen years, eight of which are passed in the Army and seven in the Landwehr, excepting for the Militia of the mounted branches and for the torpedo-boat service, who are not compelled to serve in the Landwehr.

The exemption usually accorded to only sons has been done away with.

The minimum height has been raised from 5 feet $\frac{1}{2}$ inch to 5 feet $1\frac{1}{4}$ inches. As far as regards the organisation of the Army, the number of the infantry regiments (which is at present nine, and consists of five battalions, one of which is a fortress battalion) is increased to fourteen, of which twelve consist of four battalions each, and two fortress regiments, one of five and the other of four battalions. Each of the three regiments of field artillery consists of eight batteries instead of six (two groups of three and one group of two). The pontoon corps is transferred from the artillery to the engineers.

The three infantry divisions of three regiments each, which at present exist, are transformed into three mixed divisions, each consisting of three infantry regiments, one regiment of cavalry and one regiment of field artillery. Besides which there has been formed one reserve division of three infantry regiments and two groups of fortress troops, each consisting of one infantry regiment and two garrison artillery regiments of ten companies.

The entire inspection of the artillery is divided into two: that of the mounted, and that of the unmounted branches.

The rank of lieutenant-general is reserved for the commandant of the reserve division, who is appointed chief of the field army, for the chief of the staff, and for the commandant at Amsterdam. The latter has at present the rank of major-general.

Inspectors of military administration and of the various arms, commanders of unit divisions, etc., will have the rank of major-general. The ranks of lieutenant-colonel and of major are replaced by that of "battalion commander" (Overste), which is made up into two classes.

According to the explanation, the total strength of the field army, not including the reserve division and the auxiliary services, is estimated at 45,000 men; that of the fortress troops at 27,000.

The Landwehr, intended to take the place of the Schutterij, which will be done away with as soon as the effects of the new law make themselves felt, will be organised by Royal proclamation. The military obligations of the men forming it will be fixed by a special law.

The country will be divided into 36 Landwehr battalion districts. A superior officer or a pensioned or retired captain will be placed in command of each of

these districts. He will undertake the recruiting and in war-time will take the command of an infantry battalion raised in his department.

Besides the 36 battalions mentioned above, the Landwehr will consist of:—

- 36 companies of garrison artillery.
- 4 " engineers.
- 1 company of hospital orderlies.
- 1 " administration troops.

—*Bulletin de la Presse et de la Bibliographie Militaires.*

RUSSIA.—The military district at Vilna has been provided with a new practice ground, which the field artillery made use of for the first time this year. The practice ground is situated about 20 kilometres from Baranovitchi, and lies between two rivers, both of which provide excellent drinking water. It is surrounded by vast pine forests in which lie a portion of the huts for the accommodation of the soldiers. The actual area consists of about 6,000 acres, which it is proposed to increase by a further 1,500 acres.

After the purchase of the new lands, shooting up to 4,300 metres could be executed, from east to west or from west to east. When three groups of batteries fired at the same time the direction could be varied 15° and even to 30° from certain positions. Changes of position either to the front or rear could be carried out with tolerable ease.

The regiments of the 30th Infantry Division will from henceforward carry out their musketry at the same time as the artillery conduct their gunnery practice.

Each year the artillery make great progress both in shooting and in drill. The rapidity of the fire has more than doubled, and the drill has improved in the same proportion.

The employment of single batteries has been done away with; it is usually by entire groups, or even when the ground permits, by masses of many groups that they come into action.

Since last year the musketry and gunnery inspection for the infantry and artillery have been carried out simultaneously. The results furnished are particularly instructive. At the inspection, which took place on the 30th June last in the presence of the commander of the Vilna military district, three groups of 24 pieces, that is to say 72 guns, and the whole of the infantry of the 30th Division could be seen in simultaneous action. In the first position, which occupied a frontage of about 1,250 metres, each battery changed its objective once or twice. The fire then ceased and the infantry advanced in echelon from the right to envelope the enemy's left. During this movement a portion of the artillery took up a fresh position and prepared the way for the infantry attack. The following day manoeuvres were executed by all the artillery of the 4th Army Corps. It was proved once more that the new practice ground gave ample room for the deployment, in many different directions, of the whole of the artillery of an army corps. —*Allgemeine Militär-Zeitung.*

A propos of the criticisms recently made of the British military medical service, it is interesting to note that Russia is far in advance in this service. Russia has six large and three hundred small hospitals connected with the Army, besides smaller lazarettos, and in some of these the equipment is far in advance of anything the Services possess in England.

The wards are excellent, and replete with appliances of every kind; and there are bandage rooms, purifying rooms, operation theatres, bacteriological departments for physical research, laboratories for teachers, and laboratories for students, all excellent and complete. They have liberal provision of everything calculated to assist the most advanced work and investigation—X-ray rooms, photographic rooms, electrical rooms, immersion lenses, centrifuges, etc.—to an extent that excites the marvel and envy of foreign visitors. The work in the

wards, such as case-taking, temperature-recording, and every sort of examination and study of the cases, is of the very highest character, and the operations and dressing are carried out by the surgeons and qualified assistants in a fashion that is above praise.

Russia has 3,000 surgeons in her Army, and any of these may, if he shows ability and powers of work, obtain an order to return to study in the hospitals for a period of two years. There he has to work as a regular assistant, and, on proving his capacity, may attain a place among the teachers of the institution, or he may be transferred to the hospital of some provincial city, and there continue to perfect himself in his profession and further qualify himself for his duties in time of war.

UNITED STATES.—In the annual report of Adjutant-General H. S. Corbin, the total strength of the Army is placed at 64,586 Regulars and 34,574 Volunteers, a total of 99,160 men. We observe, however, that the table of distribution of these men accounts for only 99,158, a discrepancy of two. The distribution of our forces is thus given by the report:—In the United States: Officers, 1,688; men, 32,541; Porto Rico, 108 and 3,255; Cuba, 391 and 10,796; Philippines, 971 and 31,344; *en route* to Philippines, 546 and 16,553; Alaska, 15 and 484; Hawaii, 13 and 453. The expectation of the report is that by 1st December next all the infantry reinforcements will have sailed for the Philippine Islands, and that they will give a total strength of 2,117 officers and 63,608 enlisted men, an aggregate of 65,725.

The report urges the repeal of Section 15 of the Act of 2nd March, 1899, for increasing the efficiency of the Army, on the ground that "the promotions which have already occurred since the passage of this act have scattered the officers to all points of the globe occupied by our Army, and to attempt to decide to what positions these officers should be restored on 1st July, 1901, would result in endless confusion."

The officers on the active list who have died since 1st October, 1898, are given as 39, divided as follows:—Infantry, 18; staff, 9; artillery, 8; cavalry, 4. The large proportion the Staff bears in the list will be observed. In the same 32 officers on the retired list have passed away. In the table of losses in the Regular Army from 1st May, 1898, to 30th June, 1899, we find that officers killed in action numbered 24; died from disease 51, wounds 7, accident 1, drowning 2, suicide 1, officers dismissed, 1; resigned or discharged, 15; retired, 91. Among the enlisted men the losses were thus divided:—Killed in action, 270; died from wounds 114, disease 15,424, accident 72, drowning 48, suicide 32, murder 26; men retired, 133; deserted, 3,036; expiration of service, 8,887. The men discharged were 2,102 by disability, 924 by sentence of general courts-martial, and 33,512 by order.

The usual maximum per company of the organised State Militia did not exceed 60, and many were not maintained at that number. Of the number actually borne upon company rolls a portion declined to volunteer, upon reasonable grounds. About 25 per cent. were rejected on physical examination prior to muster and an additional number were rejected on physical re-examination after muster, a systematic inquiry having been made with a view to the elimination of all men unfitted for military service; so that about 30 of the original company is a fair estimate of the number of men previously trained, armed, and equipped in each company finally received into the United States service.

There is a refreshing bluntness in the opinion of the report that the organisations presented by the various States for muster into the service of the United States:—"A heterogeneous army, unsatisfactory not only from a military and economical view, but because of the dissatisfaction created on account of officers performing precisely similar duties under different rank and emoluments. These were the very trying and delicate conditions that confronted mustering and

medical officers. That they proved equal to this duty is fully attested by the results accomplished."

General Corbin says that experience in the Spanish war demonstrated that the "furlough," intended to mark the appreciation by the Government of the arduous service rendered and hardships endured by the troops, was productive of many evils and few benefits; the amount of pay received during furlough being insufficient to support the beneficiary; the maintenance of proper discipline was not possible; the men, equipped with light summer clothing, did not wish to draw in addition thereto suitable clothing, their muster out being so near at hand; the sudden change of climate produced much sickness; uncertainty of position prevented men from obtaining situations. The giving of the furlough also greatly increased the amount of clerical labour incident to completion of records and returns, and in the matter of commutation of subsistence alone produced complications difficult of speedy solution.

"This undesirable condition was ended," he points out, "by the act of 12th January, 1899, which granted one month's and two months' extra pay to officers and men, conditioned upon faithful service within or without the limits of the United States. The records required by the regulations were found to have been indifferently kept or not posted at all in many volunteer organisations. The addresses of many absentees were unknown, and for a large number of these no descriptive lists had been prepared. Hospital trains from cities of various States were run to different camps and carried to State hospitals sick and convalescent soldiers unaccompanied by any descriptive list, which should show amount of pay received, and clothing drawn, etc., upon which a statement of their accounts could be based by paymasters."

The Adjutant-General's observations proved that it required four and one-half days longer to muster out a regiment at a State rendezvous than it did at a United States camp, exclusive of the furlough period, during which time, however, work was continued on the records of the organisations. The records of the organisations mustered out show that the work has been done in a less satisfactory manner at State rendezvous than at the United States camps, where there was very facility for the work and every convenience for the comfort of both officers and men with a minimum expense to the Government.

The patriotism of the Regulars and volunteers who enlisted only for the war with Spain, shown by their willingly and actively serving after the expiration of their terms of service is the subject of a recommendation by General Corbin that each officer of the several volunteer organisations and each enlisted man who continued in service in the Philippine Islands after the 2nd March, 1899, until honourably discharged, be awarded a suitably inscribed medal.

The losses in the volunteers from 1st May, 1898, to 30th June, 1899, are given as 1,726 officers and 24,341 men. Of these officers 1,579 were discharged or resigned, 17 were killed in action, three died of wounds and 114 of disease. Of these men, 12,683 were discharged, 188 were killed in battle, and 3,820 died of disease.

Of the volunteer coloured troops General Corbin says:—"The captains and lieutenants were selected with much care from among the non-commissioned officers of the coloured regiments of the Regular Army, those having distinguished themselves in battle in the Santiago campaign being given preference. After this class had been given recognition, men having had service in the Spanish-American war were considered, and an equal number from each organisation of coloured volunteers serving in the Spanish-American war was selected. It is believed that the best equipped men of our coloured citizens have been commissioned in these regiments, many of them having given evidence of fitness by long service in the Regular Army and excellent conduct in battle."

Coming to the officers of the new volunteer regiments, the report says that the colonels of all the volunteer regiments called into service are officers of the Regular Army, and were selected on their efficiency records and upon recom-

mentation of their superior officers for having shown skill and bravery in battle and demonstrated special fitness for command and efficient administration. The same is true of the lieut.-colonels and majors, although a number of these were selected from the volunteers, as shown by their records to have had creditable service. The captains and lieutenants were also appointed on their record of service in the Regular and volunteer Armies.

These appointments were as nearly as possible equitably distributed among the several States and territories of the Union in proportion to the population. The reports and inspections of these regiments since their organisation show them to be efficient and possessed of excellent material, both in officers and enlisted men; in truth, it is not too much to say that better volunteer regiments have never been organised. Vacancies occurring in these regiments are being filled by promotion of the enlisted men of the same, upon the recommendation of the colonels. Classes of the enlisted men promising aptitude and qualities of good officers have been formed in each regiment for the instruction that will best fit them for the discharge of higher duties.

This policy gives satisfaction both to officers and men, and no better encouragement can be given for soldierly conduct than this hope of reward held out to meritorious enlisted men.

Appointments were made as follows :—From the Regular Army : Officers, 136 ; enlisted men, 91. From the volunteers having service in the Spanish-American war :—Officers, 785 ; enlisted men, 198.

The Adjutant-General says it is "of the utmost importance that recruits for regiments on foreign service should have the benefit of military training and have some idea of military discipline instilled into them at some depot or post in the United States where officers and specially fitted non-commissioned officers can devote more of their time and personal attention to the training of the men than can be done at foreign stations, owing to the scarcity of officers and the onerous duties devolving upon troops abroad." Akin to that subject is the declaration that there is a "necessity for fully equipped camp grounds, one each for the North, South, East, and West, is very great. These should be large and fitted with all the appliances known to modern civilisation, and kept in constant repair, ready for occupancy at any time. The experience of the last two years makes this necessity apparent, and should receive the favourable consideration of those charged with the care and instruction of our military forces. Special appropriation to this end should be made at an early day."

The number of men enlisted and re-enlisted in the Regular Army between 21st April, 1898, the opening of the war with Spain, and 26th October, 1898, is placed at 38,000. Allowing for casualties from other causes, upward of 30,000 men of the Regular Army could have claimed their discharge at the cessation of hostilities. This brings the report to the discussion of questions of recruiting, and we are told that "among other measures for securing the enlistment of specially desirable men, recruiting stations were established at all camps for the muster out of volunteers, and up to 31st August, 1899, 10,770 former volunteers had been enlisted or re-enlisted in the Regular Army. The number of general recruiting stations in cities was increased during the year to 64, with 70 or more branch stations (not counting places canvassed by volunteer recruiting officers under the direction of general recruiting officers). The total number of enlistments and re-enlistments in the Regular Army during the fiscal year ending 30th June, 1899, exclusive of the Hospital Corps, was 62,175, is classified as follows:—For the general service, 53,123; for the special recruiting service, 8,516; for staff departments, 536; a total of 62,175."

Of the 62,175 accepted applicants, 53,024 were native-born and 9,151 of foreign birth; 56,154 were white, 6,001 coloured, and 20 Indians. The enlistments numbered 43,780 and the re-enlistments 18,395. Excluding re-enlistments, the percentage of native-born among the original enlistments was 88. The reports show that the

recruiting officers making the 61,639 enlistments embraced in the first two items of foregoing list rejected 147,669 applicants—between 70 and 71 per cent. of the number seeking enlistment—as lacking in either legal, mental, moral, or physical qualifications; 3,177 of these were rejected as aliens, and 5,174 for illiteracy.

We are glad that General Corbin finds space to emphasise the fact that “the recruitment of the Regular Army was a creditable piece of work, both in the time of its accomplishment and the character of men obtained. This remark also applies to the recruitment of the volunteers. The work was largely done by officers of the Regular Army away from their regiments by reason of wounds and disability incident to exposure in the line of duty, many of whom were hardly able for any duty whatever, but volunteered for this work to enable the Department to meet the emergency. It is proper to acknowledge the efficiency and industry with which this work was accomplished.

The report devotes some space to “international courtesies,” and says that “the first expedition of troops to the distant field of operations in the Philippines sent forward through the Mediterranean Sea and the Suez Canal gave occasion for a demonstration of kindly feelings by the British Government that will long live in the memories of both participants in the spontaneous exchange of international courtesies.”

As to military reservations, General Corbin urgently recommends that “Congress be asked to provide, by legislative action, for securing the reservation of such public lands as the War Department may indicate as necessary and desirable for military purposes.”

The further recommendation is made that the West Point detachment be discontinued as enlisted men, and a like number be employed by the Quartermaster's Department to perform the labour now done by this detachment, calling attention to the fact that “under probable future conditions the number of cadets authorised at the Military Academy will not supply a sufficiently large graduating class each year to fill the vacancies in the grade of second lieutenant,” and it is recommended that the number of cadets at large, to be appointed by the president, be increased to ten annually, the number formerly authorised and that, in addition, two cadets at large from each State be provided for by the law.

The canteen question is discussed in these remarks on post exchanges:—“The work of these exchanges so far as the Regular regiments are concerned has been fulfilled in a satisfactory manner. Some considerable criticism has grown out of the operations of certain regimental exchanges in the Volunteer regiments due to a variety of causes, mainly in a disregard of the regulations governing their establishment and maintenance. It is very probable that a great majority of the exchanges in the volunteer regiments from the several States were limited to the canteen feature and to the sale of beer, which is directly contrary to the principle of the exchange system. The mustering out of these regiments, together with the recent act of Congress which prohibits the employment in the canteen section of the exchange of any officer or enlisted man, as well as the prohibition of the sale of beer on any military premises by persons not connected with the Army, has relieved the War Department from an embarrassing situation and at the same time has placed the post exchange on a more satisfactory basis.”

The aggregate receipts of the post exchanges therefore during the past two years have been \$3,420,149.81, and the dividends \$530,471.67. The net value of these exchanges, that is, the balance of their combined assets over their liabilities was on 30th June, 1899, \$253,792.26.

General Corbin invites attention to the remarks in his last report on the pay of non-commissioned officers. The report repeats what we have always claimed that what is more especially needed are men who will develop into first-class non-commissioned officers, and who are willing to remain as such. In order to secure this most desirable class and keep it, the positions must carry with them emoluments and privileges to which such men will aspire, and the corollary of

this proposition is, General Corbin says, that the conditions of our Service demand more pay.

The report recommends that the law of 18th February, 1885, be amended so as to allow the retirement of enlisted men, on their applications, after twenty-five years of faithful service.

As a better class of men are now entering the ranks than formerly, cases calling for the action of general courts-martial are comparatively rare, in the opinion of General Corbin, and the great majority of those which do occur, while beyond the jurisdiction of the inferior courts, are not of the graver kind, or such as require the expulsion of the offenders from the Service. General Corbin finds that there is an almost general agreement among officers of large experience that the sphere of garrison and regimental courts should be so extended as to give them jurisdiction of the class of cases not capital, and to confer on them power to award sentences of confinement at hard labour and forfeiture of pay for not more than four months; also to empower commanders of separate battalions to institute courts of like jurisdiction. The effect of the proposed legislation could not fail to be beneficial. General courts-martial would be instituted on rare occasions only; all except the gravest offences would be promptly disposed of with a minimum of expense, delay, and the discipline of the Army be confirmed.

Coming to his own office, the Adjutant-General says that no change has occurred in the legal organisation of the regular clerical force of this office; but the large volume of business has made necessary a continuance of the temporary force first authorised by Congress in May, 1898. The temporary force has largely consisted of people without previous knowledge or experience in handling military papers, thus charging chiefs of divisions and their principal assistant with the task of training and instruction. The death last winter of Mr. David E. Holmes, then chief of the division of mail and record, and of Mr. Benjamin Engel, two of the oldest and most valuable clerks, was a loss greatly felt. Praise is especially given to all the chiefs of divisions for valuable assistance afforded by their efforts and judicious handling of the *personnel* and business of their respective divisions. Older clerks have denied themselves even a short period of rest, and have remained at their desks for the past eighteen months, regardless of hours, eager to lend all the assistance possible to the success of the work in hand.

An amendment is suggested to the law governing leave of absence that will permit of an accumulation of leaves of absence from year to year, available to meritorious clerks, who, under the stress of office work, forego the leave to which they are entitled; and thus provide an opportunity for these clerks to obtain leave of which they are deserving, for recreation or recuperation without loss of pay.

"The condition of the artillery service, especially of the sea-coast, is not altogether satisfactory," says the report. General Corbin believes that the time has arrived when the artillery branch of the Service should be re-organised, and the field artillery separated from that engaged in the coast defence. The consensus of opinion of artillery officers is that the regimental organisation does not fulfil the requirements of the Service. It is recommended that the regimental organisation of the artillery be abolished and that a corps of field artillery and of sea-coast artillery be provided for, separate and distinct from each other. The question of centralising the defences of harbours at one post and furnishing small details for the detached posts in time of peace is believed to be in the direction of economical administration. The corps of field artillery, which would include mountain and siege guns, would be as efficient, the report says, if not more so than now, when attached to regiments with which they seldom serve.

No one at all acquainted with the work done will begrudge the general the compliment he pays his department in this, one of the closing paragraphs of the report:—"The Regular Army is now practically at a maximum, as are also the volunteer regiments. The work incident to all these changes, involving the

enlistment of 238,500 volunteers ; the increase of the Regular Army from 26,000 to 62,000 ; its subsequent reduction, and then again its increase to 65,000, necessitating numerous orders and instructions bearing on the same, to say nothing of the complete military record of every officer and man of this large force, threw upon this office work, the magnitude of which cannot be understood until undertaken. That this work has been done with accuracy and intelligence is now history. All credit is due to the assistants and the clerical force of the office."

The last recommendation of the report touches the worthy chaplains, of whom it says :—"The law for the organisation of volunteer regiments failed to make provision for chaplains. It was doubtless an oversight on the part of Congress. It is recommended that chaplains be provided for by law as far as possible, as the presence of one with each regiment is deemed very necessary.—*U.S. Army and Navy Journal*."

NAVAL AND MILITARY CALENDAR.

DECEMBER, 1899.

1st (F.)	1st Bn. Royal Scots Detachment No. 5 Company R.A.M.C. (Field Hospital)	Arrived at Cape Town from Ireland on the "Dictator."
" "	2nd Bn. Shropshire L.I. Detachment 2nd Bn. Duke of Cornwall's L.I. No. 5 Company R.A.M.C. (Field Hospital) Details	Arrived at Cape Town from England on the "Arawa."
" "	Detachment 2nd Bn. Shropshire L.I. Detachment Ammunition Column (Howitzer) R.F.A. Half 6th Dragoon Guards (Carabiniers) Detachment No. 4 General Hospital Remounts Details	Arrived at Cape Town from England on the "Chicago."
2nd (Sat.)	The Treaty for the partition of the Samoan Islands was signed at Washington by the representatives of Great Britain, America, and Germany.	
" "	Headquarters 10th Hussars Two Squadrons 10th Hussars No. 9 Company R.A.M.C. (B.C.) Details	Arrived at Cape Town from England on the "Columbian."
" "	13th Hussars Detachment No. 4 General Hospital	Arrived at Cape Town from England on the "Templemore."
" "	1st Bn. Essex Regiment Detachment No. 4 General Hospital	Arrived at Cape Town from England on the "Greek."
" "	11th Brigade Staff 1st Bn. South Lancashire Regiment No. 25 Company A.S.C. No. 27 Company A.S.C. 37th Field Company R.E. Draft R.E. Draft 1st Bn. Loyal North Lancaster Regiment Draft 1st Bn. Manchester Regiment No. 16 Company R.A.M.C. (F.H.) Details	Left England for South Africa on the "Canada."

2nd (Sat.)	2nd Bn. Middlesex Regiment Draft 2nd Bn. Yorkshire Light Infantry Detachment 2nd Bn. Dorsetshire Regiment No. 11 Company R.A.M.C. (F.H.) Details	} Left England for South Africa on the "Avondale Castle."
" "	2nd Bn. Lancashire Fusiliers Detachment No. 6 Company R.A.M.C. (Bearer Company)	
" "	2nd Bn. Royal Lancaster Regiment 2nd Bn. Berkshire Regiment Draft 5th Lancers " 9th Lancers " 19th Hussars No. 6 Company R.A.M.C. (B.C.) Details	} Left England for South Africa on the "Dilwara."
3rd (S.)	Colonel Plumer invaded the Transvaal from Tuli. The Transport "Isomore" with troops stranded 180 miles north of Cape Town. All troops and most of the guns landed and taken to Cape Town on the "Columbian," assisted by H.M.S. "Doris" and "Niobe." Most of the horses drowned.	
4th (M.)	H.M.S. "Bellona" left Portsmouth for the Mediterranean.	
" "	Launch of H.M.S. "Cressy" from the Fairfield Yard, Govan-on-Clyde.	
" "	A further squadron New South Wales Lancers arrived at Cape Town from Sydney on the "Kent."	
" "	Detachment Ammunition Park 65th Batt. R.F.A. (Howitzer) Detachment No. 4 General Hospital	} Arrived at Cape Town from England on the "Caning."
" "	One Squadron 2nd Life Guards Detachment Royal Horse Guards Detachment Ammunition Column Corps Troops Draft 5th Dragoon Guards Detachment No. 6 Company R.A.M.C. (Bearer Company)	
5th (T.)	H.M.S. "Scout" and "Canopus" commissioned at Portsmouth for the Mediterranean.	
" "	H.M.S. "Europa" left Portsmouth with relief crew for "Revenge" at Malta.	
" "	Brigade Division Staff R.F.A. Corps Troops 38th Batt. R.F.A. Ammunition Column (Howitzer) Detachment No. 4 General Hospital	} Arrived at Cape Town from England on the "Algeria."
" "	Headquarters 2nd Dragoons One Squadron 2nd Dragoons Detachment No. 5 Company R.A.M.C. (Field Hospital)	
" "	5th Brigade Staff 1st Bn. Royal Inniskilling Fusiliers No. 17 Company R.A.M.C. (B.C.) No. 11 Company A.O.C. Details	} Arrived at Durban from Ireland on the "Catalonia"

5th (T.)	Brigade Division Staff R.F.A. 5th Division	}	Left Ireland for South Africa on the "Atlantian."
	19th Batt. R.F.A.		
	28th Batt. R.F.A.		
	Ammunition Column R.F.A. 5th Division		
	Detachment Dépôt Companies R.A.M.C. (Field Hospital)		
	Details	}	Left England for South Africa on the "Denton Grange."
" "	Draft 19th Hussars		
	Detachment 45th Company R.E.		
	Remounts		
	Details		
6th (W.)	2nd Bn. Worcestershire Regiment arrived in England from Bermuda on the "Avoca."		
7th (Th.)	H.M.S. "Highflyer" commissioned at Devonport for East Indies.		
" "	H.M.S. "Dryad" commissioned at Chatham for the Mediterranean.		
" "	One Squadron 2nd Dragoons	}	Arrived at Cape Town from England on the "British Princess."
	Remounts		
	Detachment Ammunition Park		
	Half 61st Batt. R.F.A. (Howitzer)		
	Detachment No. 4 General Hospital		
	Details		
8th (F.)	Sharp fight with the Boers, who tried to raid telegraph and railways near Enslin, Western Border. Boers beaten off and communication restored.		
" "	Brilliant sortie from Ladysmith under Major-General Sir A. Hunter. Lombard's Kop carried. Boers surprised. All guns were captured or destroyed. British losses—4 killed and 17 wounded.		
" "	Detachment "A" Pontoon Troop R.E.	}	Arrived at Cape Town from Ireland on the "Montfort."
	6th Fortress Company R.E.		
	Troop 13th Hussars		
	Headquarters and half 61st Batt. R.F.A (Howitzer)		
	79th Batt. R.F.A.		
	Detachment No. 4 General Hospital		
" "	No. 4 Batt. Mountain Division R.G.A.	}	Arrived at Cape Town from England on the "Narrung."
	Army Service Corps		
	Detachment No. 4 General Hospital		
" "	Details 5th Dragoon Guards	}	Left India for South Africa on the "Palamacotta."
	" 1st Bn. Devonshire Regiment		
	" 1st Bn. Gloucestershire Regiment		
	" King's Royal Rifles		
	" 2nd Bn. Gordon Highlanders		
9th (Sat.)	Major-General Sir W. Gatacre met with a serious reverse in attempting to surprise the Boers at Stormberg, Southern Border. Attack failed, and British were forced to retire, losing 23 killed, 62 wounded, and about 600 missing.		
" "	One Squadron 2nd Dragoons	}	Arrived at Cape Town from Ireland on the "Antillian."
	Brigade Division Staff R.F.A (Howitzer)		
	37th Batt. R.F.A. (Howitzer)		
	Detachment No. 4 General Hospital		
	Details		

9th (Sat.)	Remounts Brigade Division Staff R.F.A., 2nd Division Field Troops R.E. Detachment 1st (Royal) Dragoons " 2nd Stationary Hospital A.S.C. Reservists Details	Arrived at Cape Town from England on the "Rapidan."
10th (S.)	500 men 2nd Rifle Brigade, under Lieut.-Colonel Metcalfe, from Ladysmith, made a sortie, captured Surprise Hill, and destroyed a Howitzer. British losses—12 killed, 44 wounded, 6 captured.	
" "	Major-General French drove the enemy from Vaal Kop.	
" "	A contingent from New South Wales (11 officers and 193 men) arrived at Cape Town from Sydney on the "Aberdeen."	
" "	45th Company R.E. No. 4 General Hospital Headquarters Ammunition Column (Corps Troops) Details	Arrived at Cape Town from England on the "Goth."
" "	20th Fortress Company R.E. Details 4th Batt. R.F.A. 78th Batt. R.F.A. Detachment No. 4 General Hospital Headquarters Ammunition Park	Arrived at Cape Town from England on the "Sicilian."
11th (M.)	Lord Methuen attacked 12,000 Boers entrenched at Magers- fontein, Western Border. The attack failed, although the British troops held their positions. British losses about 957. Boer losses not known.	
12th (T.)	H.M.S. "Latona" commissioned at Portsmouth for relief service.	
" "	Garrison at Mafeking placed on reduced rations.	
13th (W.)	Major-General French defeated about 1,800 Boers between Arundel and Naawpoort. British losses 9. Boer losses 40.	
" "	1st Bn. York and Lancaster Regiment Draft 1st Bn. Somerset Light Infantry " 1st Bn. Border Regiment " King's Royal Rifles " Rifle Brigade Depôt Companies R.A.M.C. (F.H.) Portland Hospital	Left England for South Africa on the "Majestic."
" "	Headquarters and 2 Squadrons 14th Hussars 20th Batt. R.F.A. Detachment 19th Batt. R.F.A. Draft 1st Bn. Durham L.I. " 2nd Bn. Royal West Surrey, Regiment) Detachment Depôt Companies R.A.M.C. (Field Hospital) Details	Left England for South Africa on the "Victorian."
" "	Hospital-ship "Princess of Wales" left England for South Africa.	
14th (Th.)	Engagement between Mounted Infantry and the Boers near the Orange River. Boers retreated to Goemansberg.	
" "	The Queensland Contingent (14 officers, 250 men, 300 horses, and 2 machine guns) arrived at Cape Town from Brisbane on the "Cornwall."	

- 14th (Th.) 1st Bn. Sherwood Foresters (Derbyshire Regiment) arrived at Durban from Malta on the "Dunera."
- 15th (F.) General Sir Redvers Buller advanced from Chieveley, Eastern Frontier, against Boer positions near Colenso, on the Tugela River. British force was repulsed with the loss of 11 guns and 1,100 casualties. Boer casualties not known.
- " " An Army Order was issued for the mobilisation of a 7th Division for service in South Africa.
- " " H.R.H. the Prince of Wales presented the medals for Omdurman to the 1st Bn. Grenadier Guards.
- 16th (Sat.) Launch of torpedo-boat destroyer "Niji" from Yarrow's Works for Japanese Government.
- " " 10th Brigade Staff
2nd Bn. Royal Warwickshire Regiment
No. 32 Company A.S.C.
Detachment No. 10 Company R.A.M.C. (Bearer Company) } Arrived at Cape Town from England on the "Gaul."
- " " 1st Bn. Yorkshire Regiment
Farriers
No. 11 Company R.A.M.C. (Bearer Company)
Divisional Staff } Arrived at Cape Town from England on the "Douce Castle."
- " " 12th Brigade Staff
1st Bn. Royal Irish Regiment
2nd Bn. Wiltshire Regiment
Detachment No. 4 Company R.A.M.C. (Field Hospital) } Left England for South Africa on the "Gascon."
- " " Draft 1st Bn. Royal Scots
" Devonshire Regiment
" 1st Bn. Royal Inniskilling Fusiliers
" 2nd Bn. Duke of Cornwall's Light Infantry
" 1st Bn. Welsh Regiment
" 1st Bn. Gordon Highlanders
" 2nd Bn. Royal Irish Rifles
" 1st Bn. Connaught Rangers
" 1st Bn. Argyll and Sutherland Highlanders
Detachment R.E. Regimental Staff, 6th Division
Detachment No. 5 General Hospital } Left England for South Africa on the "Avoca."
- " " 2nd Bn. Bedford Regiment
No. 7th Company A.S.C.
Detachment No. 8 Company R.A.M.C. (Bearer Company) } Left England for South Africa on the "Sumatra."
- 17th (S.) R.E. Regimental Staff, 6th Division
38th (Field) Company R.E.
2nd Bn. Worcestershire Regiment
No. 10 Company A.S.C.
No. 23 Company A.S.C.
No. 8 Company R.A.M.C. (Bearer Company)
No. 4 Company R.A.M.C. (Field Hospital) } Left England for South Africa on the "Tintagel Castle."

- 18th (M.) H.M.S. "Scout" left Portsmouth for the Mediterranean.
- " " Field-Marshal the Right Hon. Lord Roberts, K.P., G.C.B., G.C.S.I., G.C.I.E., V.C., appointed Commander-in-Chief in South Africa, with Major-General Lord Kitchener, G.C.B., K.C.M.G., as Chief of the Staff.
- " " The War Office announced that the remainder of the Army Reserve was to be called out, 9 battalions of Militia, Yeomanry, and Volunteers to go to South Africa, with artillery reinforcements, Colonial offer of troops to be accepted, and irregular cavalry to be raised locally in South Africa and at home.
- " " 2nd Bn. Dorsetshire Regiment
No. 10 Company R.A.M.C. (B Company)
Draughts 1st Liverpool Regiment
" 1st Munster Fusiliers
A.P.C. } Arrived at Cape Town from Ireland on the "Simla."
- 19th (T.) H.M.S. "Canopus" left Portsmouth for the Mediterranean.
- " " Regulations issued by the War Office regarding the employment of Yeomanry and Volunteers in South Africa.
- " " 2nd Bn. Lancashire Fusiliers
Detachment No. 6 Company R.A.M.C. (Bearer Company) } Arrived at Cape Town from England on the "Norman."
- " " "T" Batt. R.H.A.
"Q" Batt. R.H.A.
Draft 2nd Bn. Royal Irish Fusiliers
Detachment No. 5 General Hospital } Left England for South Africa on the "Manchester Corporation."
- 20th (W.) 11th Brigade Staff
1st Bn. South Lancashire Regiment
No. 25 Company A.S.C.
No. 27 Company A.S.C.
37th Field Company R.E.
Draft R.E. } Arrived at Cape Town from England on the "Canada."
- " " 1st Bn. Loyal North Lancashire Regiment
" 1st Bn. Manchester Regiment
No. 16 Company R.A.M.C. (Field Hospital)
Details
- 21st (Th.) H.M.S. "Latona" left Portsmouth for Bermuda with relief crew for "Indefatigable."
- " " Details 5th Dragoon Guards
" 1st Bn. Devonshire Regiment
" 1st Bn. Gloucestershire Regiment
" King's Royal Rifles
" 2nd Bn. Gordon Highlanders } Arrived at Durban from India on the "Palamcottah."
- " " Detachment 6th Infantry Division Staff
No. 16 Company S.D., R.G.A.
Draft 2nd Bn. Northumberland Fusiliers
" 2nd Bn. West Yorkshire Regiment
" 2nd Bn. Shropshire L.I.
" 1st Bn. Royal Dublin Fusiliers
Detachment No. 5 General Hospital
Details } Left England for South Africa on the "Jelunga."

21st (Th.)	One Squadron 14th Hussars Brigade Division Staff R.H.A. "U" Batt. R.H.A. Detachment "T" Batt. R.H.A. Ammunition Column Draft 2nd Bn. Royal Scots Fusiliers Draft 1st Bn. Royal Welsh Fusiliers Detachment No. 5 General Hospital Post Office Corps Details	} Left England for South Africa on the "Cestrian."
22nd (F.)	H.M.S. "Europa" arrived at Portsmouth with relieved crew from "Revenge."	
" "	H.M.S. "Goldfinch" paid off at Sheerness from Australia.	
" "	13th Brigade Staff 2nd Bn. East Kent Regiment 1st Bn. Oxfordshire L.I. No. 7 Company R.A.M.C. (B.C.)	} Left England for South Africa on the "Gaika."
" "	Draft 1st Dragoons " Royal Artillery Remounts Details	} Left England for South Africa on the "Ottoman."
23rd (Sat.)	Field-Marshal Lord Roberts's Staff 6th Division Staff	} Left England for South Africa on the "Dunottar Castle."
24th (S.)	A detachment for Major-General Sir W. Gatacre's force occupied Dordrecht on the Southern Frontier.	
" "	One Squadron 1st Life Guards One Squadron Royal Horse Guards Detachment No. 6 Company R.A.M.C. (Bearer Company) Draft 18th Hussars	} Arrived at Cape Town from England on the "Maplemore."
25th (M.)	H.M.S. "Sparrow" arrived at Plymouth from West Coast.	
" "	2nd Bn. Royal Lancaster Regiment Draft 5th Lancers " 9th Lancers " 19th Hussars 2nd Bn. Royal Berkshire Regiment No. 6 Company R.A.M.C. (B.C.) Details	} Arrived at Cape Town from England on the "Diwara."
26th (T.)	2nd Bn. Middlesex Regiment Draft 1st Bn. Yorkshire L.I. Detachment 2nd Bn. Dorsetshire Regiment No. 11 Company R.A.M.C. (Field Hospital) Details	} Arrived at Cape Town from England on the "Avondale Castle."
" "	Siege Train, R.G.A. Detachment "B" Pontoon Troops, R.E. Detachment Dépôt Companies R.A.M.C. (Field Hospital)	} Arrived at Cape Town from England on the "Tantallon Castle."
" "	Draft 2nd Dragoons Remounts Details	} Left England for South Africa on the "Nomadic."

27th (W.)	Brigade Division Staff R.F.A. 6th Division	} Left England for South Africa on the "Cymric."
	76th Batt. R.F.A.	
	81st Batt. R.F.A.	
	82nd Batt. R.F.A.	
	2nd Bn. Gloucestershire Regiment	
	Draft 2nd Bn. Scottish Rifles	} Left England for South Africa on the "British Prince."
	No. 18 Company R.A.M.C. (Field Hospital)	
" "	Ammunition Column 6th Division	
	Mounted Infantry 6th Division	
	Detachment No. 18 Company R.A.M.C. (Field Hospital)	
28th (Th.)	H.M. "Anson" arrived at Plymouth from the Mediterranean.	} Left England for South Africa on the "Orient."
" "	1st Bn. West Riding Regiment	
	Draft R.A.	
	" 1st Bn. Essex Regiment	
	No. 6 Company R.A.M.C. (Field Hospital)	
29th (F.)	One Squadron 2nd Life Guards	} Arrived at Cape Town from England on the "Pinemore."
	Detachment Royal Horse Guards	
	Detachment Ammunition Column	
	Corps Troops	
	Draft 5th Dragoon Guards	
	Detachment No. 6 Company R.A.M.C. (Bearer Company)	} Arrived at Cape Town from England on the "Atlantian."
" "	Brigade Division Staff R.F.A. 5th Division	
	19th Batt. R.F.A.	
	28th Batt. R.F.A.	
	Ammunition Column R.F.A. 5th Division	
	Detachment Depot Companies R.A.M.C. (Field Hospital)	} Arrived at Cape Town from England on the "Majestic."
	Details	
30th (Sat.)	Skirmish near Dordrecht. Boers defeated with loss.	
" "	1st Bn. York and Lancaster Regiment	
	Draft 1st Bn. Somerset L.I.	
	" 1st Bn. Border Regiment	} Left England for South Africa on the "America."
	" King's Royal Rifles	
	" Rifle Brigade	
	Depôt Companies R.A.M.C. (F.H.)	
	Portland Hospital	
" "	Mounted Infantry 6th Division	} Left England for S. Africa on the "St. Andrew."
	Detachment No. 6 Company R.A.M.C. (Field Hospital)	
" "	Draft 6th Dragoons	
	Remounts	
	Mounted Infantry 6th Division	
	Details	

FOREIGN PERIODICALS.

NAVAL.

ARGENTINE REPUBLIC.—*Boletín del Centro Naval*. Buenos Aires: November, 1899.—“Plan for Determining the Elements of the Terrestrial Magnetic Field on the Coasts of the Republic.” “The Navy League.” “A Comparison between the Military Harbours of Bahia and Keyham.” “Practical Naval Architecture.” “Protection of the Coasting Trade.” “Naval Notes.”

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens*. No. 1. Pola, January, 1900.—“Contributions on the Geometry of Scouting at Sea.” “Decentralisation of the Means of Communicating Orders in Battle-ships.” “Parsons' Steam Turbine.” “New War-ship Construction.” “The Netherlands Naval Estimates for 1900.” “Foreign Naval Notes.”

BRAZIL.—*Revista Marítima Brasileira*. Rio de Janeiro: November, 1899.—Has not yet been received.

FRANCE.—*Revue Maritime*. Paris: October, 1899.—“An Enquiry into the Forms of Hull most favourable for obtaining High Speeds.” “New Instrument for Correcting Errors of Compass Bearing.” “The Defence of the Coasts of France from Dunkirk to Bayonne in the 17th Century.” “Organisation of the Personnel of the English Navy.” “The Naval Forces of France and Italy in the Mediterranean.” “New Naval Constructions in Italy.” “Foreign Naval Notes.” “Development of the German Maritime Commerce.”

Le Yacht. Paris: 2nd December, 1899.—“Naval Programmes and Naval Policy.” “Yachting Notes.” “The Superior Staff School of the Navy. 9th December.—“Sailing-Ships and the New Law for the Merchant Navy.” “Yachting Notes.” “Historical Notices of French War-ships: The ‘Linois.’” “Protection of Openings and Hatchways on board Ships.” 16th December.—“The Necessary Effort.” “Yachting Notes.” “Promotion in the Navy.” “Trials of the Brazilian Battle-ship ‘Marechal Deodoro.’” 23rd December.—“The Credit for the Navy.” “Coaling at Sea.” “Historical Notices of French War-ships: The ‘Forbin.’” (continued). “The Mediterranean Squadron in the Levant.” “The Merchant Navy: French and Foreign.” 30th December.—“The Maritime Powers and the Submarine Boat.” “Yachting Notes.” “Historical Notices of French War-ships: The ‘Amiral Duperré.’” (continued). “The Mediterranean Squadron in the Levant.” “Two Shipwrecks.”

Le Moniteur de la Flotte. Paris: 9th December, 1899.—“The Trial Basin for Ship Models at Vincennes.” “The Navy in Parliament.” “Naval Defence.” “Promotion in the Navy: Official Report.” 16th December.—“A Direct Service between Paris and London.” “The Navy in Parliament.” “Colonial Notes.” 30th December.—“German Naval Estimates for 1900-1.” “The Navy in Parliament.” “Colonial Notes.”

La Marine Française. Paris: 15th December, 1899.—“The Net Cost of Ships-of-war in France and England.” “The Russian Orders in the United States: The Cruiser ‘Varyag.’” “Some Remarks on Naval Administration.” “Water-Tube Boilers.” “What the Colonial Army ought to be!” “The War with England.” “The Naval Estimates for 1900.” “Table of Events during the Year 1899.”

GERMANY.—*Marine Rundschau*. Berlin: December, 1899. — Frontispiece: "The Seadler." "Lessons from Sea Power." "The Life-saving Arrangements on the Coasts of Europe." "Napoleon's Designs Against England." "The Survey of Kiau-Chau." "Proverbs and Proverbial Methods of Speech about Seamanship, Sea, and Fishing Life in the German Language" (*continued*). "Nordelbisch-Danish." "Foreign Naval Notes."

ITALY.—*Rivista Marittima*. Rome: December, 1899. — "The New Type of Battle-ships." "Spain and her Probable Alliances." "Ancient Breech-loading Guns and Multiple Fire." "The Maritime Fisheries in Italy." "The Routes for Emigration." "The Determination of Time." Letters to the Editor:—"Naval Construction and Hygiene; Two Communications." "Foreign Naval Notes." "The Mercantile Navy."

PORTUGAL.—*Revista Portuguesa, Colonial e Maritima*. Lisbon: December, 1899. — "Martin of Bohemia" (*continued*). "Colonial Agriculture" (*continued*). "The Commerce of East Africa." "Historical Destinies, South Africa." "South Africa and the Anglo-Boer War." "Foreign Naval Notes."

SPAIN.—*Revista General de Marina*. Madrid: December, 1899. — "An Introduction to the Study of Naval Tactics." "The Evolution of the Naval Officer." "José Francisco and Nueva Zembla." "Light-Houses in the English Channel." "Some Notes on the Organisation of some Foreign Arsenals." "Some Studies on the Niclausse Water-tube Boilers." "Calculations of the Light-Power of Light-Houses." "Foreign Naval Notes."

UNITED STATES.—*Journal of the American Society of Naval Engineers*. Washington: November Quarter, 1899. — "Contract Trials of the U.S. Sea-going Battle-ship 'Kearsarge.'" "Extracts from the Annual Report of the Engineer-in-Chief." "Object-Lessons." "The Progress of Steam Navigation." "Coatings for Cast-iron Water-pipes." "The Thermal Efficiency of Steam Engines." "Naval Notes."

MILITARY.

AUSTRIA-HUNGARY. *Militär-Zeitung*. Vienna: 2nd December, 1899. — "The Army Estimates for 1900." "Examination for Cadets." 10th December. — "On the Regulation for Pay." "Comments on the War Budget." "The War in Africa" (*continued*). 18th December. — "The Development of the Austrian Landwehr." "The Naval Budget of 1900." "Victor Silberer on Ballooning." "Reform in Military Jurisprudence in Austria and in France." 26th December. — "Our Navy." "Increase of Salary and Rates of Pay." "The War in Africa" (*continued*).

Mittheilungen über Gegenstände des Artillerie- und Genie-Wesens. Vienna: December, 1899. — "On the Technicality of Fire Observation." "Considerations for the Management of Coast Artillery Fire." "Peat as a Textile Fabric."

Organ der Militär-wissenschaftlichen Vereine. Vienna: December, 1899. — "Austrians and Russians in Italy, 1799."

BELGIUM.—*Bulletin de la Presse et de la Bibliographie Militaires*. Brussels: 15th December, 1899. — "The Hague Conférence" (*continued*). "Infantry Tactics from 1870 to 1893, by Löbell." "The Anglo-Boer War." 31st December. — "The Study of War." "The Anglo-Boer War" (*continued*).

FRANCE.—*Revue du Cercle Militaire*. Paris: 2nd December, 1899. — "German Opinion of our Alpine Troops." "An Anniversary—Austerlitz."

"Four-Gun Batteries" (*concluded*). "The War in the Transvaal" (*continued*, with map). "The Battery of the Dead—November, 1870." 9th December.—"Camps of Instruction." "The Veterinary Service." "The War in the Transvaal" (*continued*). "The Training and Use of Saddle Horses." 23rd December.—"The English Nation and its Army—The Soldier." "The War in the Transvaal" (*continued*). "Bonaparte in Italy, 1796." 30th December.—"A Sure Eye." "The War in the Transvaal" (*continued*).

Le Spectateur Militaire. Paris: 1st December, 1899.—"Machine Guns in Modern War." "Recollections of Madagascar" (one sketch, *continued*). "Harness Galls" (*continued*). "From the Cape to the Zambesi" (one map). "The Campaign of 1866" (six sketches, *continued*).

Revue d'Artillerie. Paris: December, 1899.—"Drill Regulation for German Field Artillery" (*concluded*). "Distribution of Artillery Fire" (*continued*). "On Prismatic Field-Glasses." "Longitudinal Grooves in Rifle Cartridge Cases."

Revue de Cavalerie. Paris: December, 1899.—"The Promotion of Cavalry Lieutenants." "New Words, Old Songs—The *fin de siècle* Conscripits of War" (*continued*). "Notes on Military Training." "The Cavalry of the 1st and 2nd Army Corps from the 7th to the 15th August, 1870, by Lieut.-General von Pelet-Narbonne" (*continued*).

Revue du Service de l'Intendance Militaire. Paris: November—December, 1899.—"Note on the Anobinin Paniceum or Biscuit Borer." "Foreign Seeds contained in Oats." "Report on the Proportion of Sulphuric Acid which may be normally contained in Leather destined for Military Equipment." "Extracts from the Works of Parmentier."

Journal des Sciences Militaires. Paris: December, 1899.—"Three Columns to Tonkin (1894—1895), III. Operations in the Yen-Thé (October—December, 1895)" (*concluded*). "How could Metz be left in 1870?" "The Blockade of Landau, 1814." "A Last Word on the Colonial Army." "German Tactics according to the Experience of the Grand Manœuvres 1896-1898." "About the Army of the Reserve in 1800." "Flank Formations in Action" (*concluded*).

Revue Militaire. Paris: December, 1899.—"The Spanish-American War." "The last English Army Budgets" (*concluded*). "The Higher Commission for State Defence in Italy." "The Origin of Grand Manœuvres—Camps of Instruction in the 17th and 18th Centuries." "The Commencement of the Campaign of 1792 by the Army of the North."

Revue du Génie Militaire. Paris: December, 1899.—"Permanent Fortifications." "On the Subject of the Housing of Garrison Troops" (*concluded*). "On the Pamphlet regarding the conditions of the Progress of Military Works."

GERMANY.—*Deutsche Heeres-Zeitung*. Berlin: 2nd December, 1899.—"From the Headquarters of the Silesian Army." "Switzerland in the Event of a European Conflict." "From the South African Seat of War" (*continued*). 6th December.—"The Main Conditions of the Technical Military Occupations of Russian Officers in a Provincial Garrison." "Switzerland in the Event of a European Conflict" (*continued*). "From the South African Seat of War" (*continued*). 9th December.—"Lieut.-General von Schwartzkoppen on the 16th August, 1870." "Switzerland in the Event of a European Conflict" (*continued*). "The South African Seat of War. 13th December.—Lieut.-General von Schwartzkoppen on the 16th August, 1870" (*continued*). "Switzerland in the Event of a European Conflict" (*concluded*). "From the South African Seat of War" (*continued*). 16th December.—"The New Increase in the German Navy." "Lieut.-General von Schwartzkoppen on the 16th August, 1870" (*continued*). "From the South African Seat of War" (*continued*). 20th December.—"The New Increase in the German Navy" (*concluded*). "Lieut.-General von Schwartzkoppen on the 16th August, 1870" (*continued*). "From the South African Seat of War"

(continued). 23rd December.—"The Question of Large Manceuvre Grounds in France." "Lieut.-General von Schwartzkoppen on the 16th August, 1870" (continued). "From the South African Seat of War" (continued). 30th December.—"The French Coast Fishery." "Lieut.-General von Schwartzkoppen on the 16th August, 1870" (concluded). "From the South African Seat of War" (continued).

Militär-Wochenblatt. Berlin: 2nd December, 1899.—"England and the Transvaal" (continued.) "Historical Examples of Siege Warfare." "Defeat and Death of the Khalifa." 6th December.—"Authentic Intelligence regarding Field-Marshal von Moltke's Critical Essay on the Campaign of 1809." "The Vital Necessity to us for a Strong German Fleet." "Bredow's Attack on the 16th August, 1870." 9th December.—"Authentic Intelligence regarding Field-Marshal von Moltke's Critical Essay on the Campaign of 1809" (concluded). "England and the Transvaal" (continued). "An Attempted Assault." "New Regulation for the Russian Field Artillery." 13th December.—"Divisional Cavalry." "The Great Autumn Manœuvres of 1899 in France." 20th December.—"The Training of Officers." 23rd December.—"Military Aspect of the Imperial Journey in the Holy Land." "The Training of Officers" (concluded). "England and the Transvaal" (continued). "Strength and Composition of the English Forces called out against the Boers" (continued). 30th December.—"The Turn of the Year." "The Fight for Predominance in Germany from 1859 to 1866." "England and the Transvaal" (continued).

Jahrbücher für die Deutsche Armee und Marine. Berlin: December, 1899.—"The Nature and Meaning of Military Geography." "A Supplement to the History of the Prussian Army." "The Italian Army and Navy during the First Half of the Year 1899." "A New 'Leithner.'" "The Estimates for the French War Budget for 1900." "The Remedy Against the Judgment of a Military Court of Law." "Electricity in Dockyards."

Neue Militärische Blätter. Berlin: December, 1899.—"Military Scenes from the Peaceful Life of the Old Prussian Army" (continued). "Thoughts on Military Culture, Education, and Intellect" (continued). "The Wurtemberg Imperial Manœuvres of 1899" (continued). "Tactical Innovations in the New Field Artillery Drill Regulation."

Internationale Revue über die gesammten Armeen und Flotten. Dresden: December, 1899.—"The English Naval Manœuvres, 1899." "The Russian Field Service Instructions." "The Russian Cavalry Manœuvres at Orang." "United States Naval Ordnance." "Strategic Glance at the Persian Gulf." "The South African War." "An Army Division in Combat." "New Strategic Canal."

Supplement.—"Basis of Germany's Military Strength." "The Great Projected French Canal." "Recent Trials of Steel Nickel Krupp Plates." "The Great Initial Velocities in Artillery."

ITALY.—*Rivista di Artiglieria e Genio.* Rome: November, 1899.—"Geodetical Determinations for Artillery Fire." "The Italian Artillery in the Napoleonic Wars." "The Steel Works of the Ligurian Metallurgical Society at Sestri Ponente." "Manufacture of Armour Cement." "French Regulations for Siege Warfare." "New Regulations for Austrian Field Artillery." "New Firing Instructions for Austrian Field Artillery." "A New Apparatus for Controlling the Aiming and Firing of Small Arms."

Rivista Militare Italiana. Rome: 1st December, 1899.—"The War in South Africa." "The Emigration Legions and the Provincial Troops for the Defence of the Roman Republic." "Moltke's Opinion of the Battle of San Martini." "Across Central Europe on a Bicycle." 15th December.—Has not been received.

SPAIN.—*Memorial de Ingenieros del Ejército*. Madrid: November, 1899.—“Projected Railways” (*continued*). “The Problem of Lightning Conductors” (*concluded*). “The Reserve Pay of Engineers.”

Revista Técnica de Infantería y Caballería. Madrid: 1st December, 1899.—“Pay and Promotion” (*continued*). “The Army National Institution.” “The Open Ladder.” “The Anglo-Boer War.” “The Laboratory for Material of the Engineers.” “Historical Reminiscences of Molke at Sadowa.” 15th December.—“The Anglo-Boer War” (*continued*). “Something Practical about Cavalry.” “Method of Instruction of Recruits.” “The Army and the Country.” “Napoleon at Waterloo.”

RUSSIA.—*Voënnnyi Sbornik*. December, 1899.—Has not yet been received.

SWITZERLAND.—*Revue Militaire Suisse*. Lausanne: December, 1899.—“Colonel Ferdinand Lecomte.” “Cavalry Machine Guns” (with photographs). “The German Imperial Manceuvres in Wurtemberg in 1899” (with a map).

NOTICES OF BOOKS.

The River War. An Historical Account of the Re-Conquest of the Soudan. By WINSTON SPENCER CHURCHILL. Edited by COLONEL F. RHODES, D.S.O. In Two Volumes. London: Longmans, Green & Co. 1899.

It is to be hoped that the newly appointed Sirdar of the Egyptian Army, Sir F. R. Wingate, will set his Intelligence Department to work to produce an adequate official record of the campaigns that began with the advance from Wady Halfa in March, 1896, and ended with his own victory at Om Debrikat and the death of the Khalifa last autumn. Till such a work is produced it is likely Mr. Winston Churchill's two handsome volumes will be accepted as the standard history of the re-conquest of the Soudan, and even then they will still have a claim to a permanent place in the records of the Soudan War. The final episode of the successful pursuit of the Khalifa is not included in them. The ex-ruler of Omdurman was still at large in Kordofan when they were completed. Their story ends with the unsuccessful attempt to hunt him down at Sherkeleh Lake in January, 1899. But they tell the story of the preceding campaigns in ample detail, and the narrative is illustrated not only with a number of excellent sketches by Mr. Angus McNeill, of the Seaforth Highlanders, and photogravure portraits of the principal commanders, but also by a beautiful series of large scale maps and plans based on material supplied by the Egyptian Intelligence Department. Mr. Churchill himself modestly describes these maps and plans as the most valuable feature of the book. They are wonderfully complete and elaborate. Thus for the battle of Omdurman we have three plans showing various stages of the fight, besides detailed plans of the charge of the 21st Lancers, and MacDonald's repulse of the final Dervish attack, and a plan of the ground after the battle, showing where the Dervish dead and wounded lay. Plans like these almost tell the story, even without the text, and they often make clear points that were left obscure by previous narratives. They make the book a work that no student of the campaign can afford to neglect.

Mr. Winston Churchill served as an officer attached to the 21st Lancers in the Omdurman campaign, and rode in the famous charge. In the same expedition he acted as correspondent of the *Morning Post*, with a view, as he says, “to making war support itself.” This combination of combatant and journalistic duties is not usually permitted, and it certainly has its drawbacks. Thus Mr. Churchill tells how on the morning of the Omdurman battle he was sent out with a patrol of the Lancers to observe the movements of the Khalifa's army. He tells exactly what the patrol did, and it is easy to follow on the map every move he

made, but he acknowledges that these were not entirely dictated by military necessities. Thus he says :—

"As it became broad daylight—that is to say, about ten minutes to six—I suddenly realised that all the masses of the enemy were in motion and advancing swiftly. Their Emirs galloped about and before their ranks. Scouts and patrols scattered themselves all over the front. Then they began to cheer. They were still a mile away from the hill and were concealed from the Sirdar's army by the folds of the ground. The noise of the shouting was heard, albeit faintly, by the troops down by the river. But to us, watching on the hill, a tremendous roar came up in waves of intense, like the tumult of the rising wind and sea before a storm. In spite of the confidence which I felt in the weapons of civilisation the formidable aspect of this great host of implacable savages, hurrying eagerly to the attack of the zeriba, provoked a feeling of loneliness, which was shared, I think, by the rest of the little patrol. Partly to clear the mind of such unnecessary emotions, *and also with the design of thereafter writing this account*, I moved to a point on the ridge which afforded a view of both armies." The italics are, of course, our own.

The responsibility for the book is shared partly by Mr. Churchill, partly by Colonel Francis Rhodes, who acted as *Times* Correspondent in the Atbara and Omdurman campaigns, and who was able to secure some important materials from the Egyptian Intelligence Department. Colonel Rhodes has read the proofs and added a number of foot-notes, some of them confirming, others criticising, the author's statements. Thus, for instance, where Mr. Churchill remarks that a horse battery at Omdurman was of little service to Colonel Broadwood's cavalry, the editor, Colonel Rhodes, points out in a note that the guns were antiquated Krupps, the shells defective, and the fuses unreliable; so it does not follow that a better equipped battery would not have done good service. The other batteries of the Sirdar's army in this and the preceding campaign were armed with Maxim-Nordenfeldt quick-firers, which gave excellent results.

Some of Mr. Churchill's other deductions are also open to criticism in the light of more recent events. After telling how the artillery cleared the Dervish sharpshooters out of the folds of the ground in front of the zeriba, he says that an artillery officer remarked to him that he would never again believe that shelter-trenches could be held under shell-fire. Our experiences in South Africa hardly point this way. But even where one feels inclined to challenge some of the author's conclusions, the facts which he brings forward in support of them are of interest. He rightly gives unbounded praise to the way in which the long line of communications by river and railway was organised, pushed forward, and maintained. The river war was essentially an engineer's campaign, but the Sirdar had in his favour the fact that there was no need to hurry. Time was on his side, and he took full advantage of it.

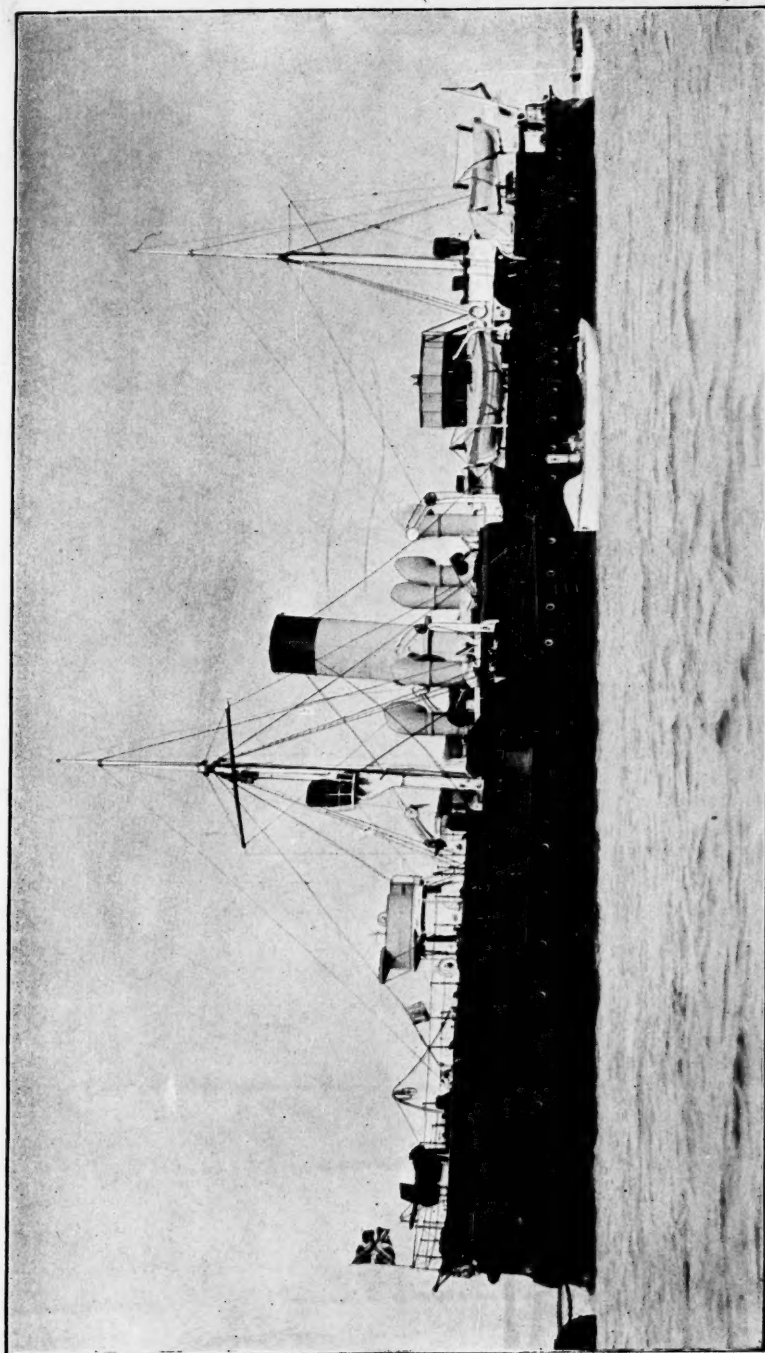
Of his experiences in the charge of the 21st Lancers, Mr. Churchill has some interesting things to tell us. He says that he and others with whom he compared notes were not conscious of hearing any sound during the few minutes of deadly hand-to-hand conflict, though there was a tremendous din all around them. The sense of sight was also affected, and everything seemed to be flickering and jerking like the pictures shown by a cinematograph. He points out that the fact that the Lancers got in amongst the enemy shows how unreliable is the assumption sometimes made that horses will not ride down upon spears and bayonets. At the same time he also insists that the experience of the same charge shows that infantry as determined as the Dervishes need not suffer any serious loss even when cavalry get in among them. Though many of the enemy were knocked down by the horses, less than 40 of them were killed in the actual charge. He discusses the movement in much detail, and shows that up to the actual moment of shock the enemy were being reinforced by a constant stream of men, who, unseen by the Lancers, were making their way into the hollow under cover of a spur of Jebel Surgham.

In his notes on the battle there is an interesting comparison between the Lee-Metford and the Martini, which is worth quoting on account of the practical lesson it conveys :—

“The superiority of the Lee-Metford to the Martini-Henry rifle was strikingly demonstrated. During the first attack at Omdurman, the First British and Second Soudanese Brigades were side by side. In front of the British, armed with the Lee-Metford the attack was stopped at 800 yards. In front of the Soudanese armed with the Martini-Henry it was not arrested until within 300 yards. It is, of course, true that the steady British infantry shot better than the wild Soudanese. But the contrast remains tremendous. To send into action against troops armed with the small-bore magazine rifles in universal use in Europe, soldiers armed only with the obsolete weapon, would be to send them to a hopeless massacre. Such is the fate at this moment reserved for the native army in India should they ever have to encounter the Russians.

“It may be worth while to state the argument in favour of re-arming the native regiments with a small-bore rifle. First of all, the native army will become a far more formidable fighting machine, and the Empire be consequently strengthened. Secondly, the Regular mixed brigades would use only one kind of ammunition—an inestimable advantage. Thirdly, the Government might display their implicit confidence in their loyal native subjects. ‘Nonsense,’ the brutal cynic will remark, ‘it would not be safe to arm the natives with as good weapons as the British soldiers.’ But in this instance it would be actually safer than the present system. Anyone can make gunpowder. No Asiatic is likely to learn to make cordite or solid-drawn cartridge cases. There are vast stores of gunpowder in India, but all cordite is in the Government magazines. Without cordite ammunition the small-bore rifle is useless. Therefore distribute the small-bore rifle and regulate the issue of ammunition; and then the sepoys will be armed with a weapon which is powerful for use against a foreign foe, powerless if employed against a paternal Government.”

On the much-vexed question of the alleged killing of the Dervish wounded, Mr. Churchill comes to the conclusion that there were too many cases in which wounded men were despatched by the native troops without any sufficient reason. He has some strong comments on the destruction of the Mahdi's tomb, a point on which he is at variance with his editor. There is an account of the Gedaref, campaign which does full justice to the splendid work done with very scanty resources by Sir Charles Parsons. A series of appendices contains the official despatches referring to the various campaigns. Altogether it is a very complete and valuable work, and has the merit of being no dry record of military movements, but thoroughly readable from the first page to the last. The introductory chapters on the rise and progress of the Madhism sum up in a few pages information contained in a large number of earlier works by other hands.



The Russian First-Class Armoured Gun-boat "KHRABRY," 1,492 tons ; 3,000 I.H.P. ; Speed, 15 knots.

PROTECTION :—5-inch steel water-line belt ; 1½-inch armour deck.

ARMAMENT :—Two 8-inch guns, one 6-inch Q.F., and ten small Q.F. guns.



